

THE IRON AGE

New York, August 24, 1916

ESTABLISHED 1855

VOL. 98: No. 8

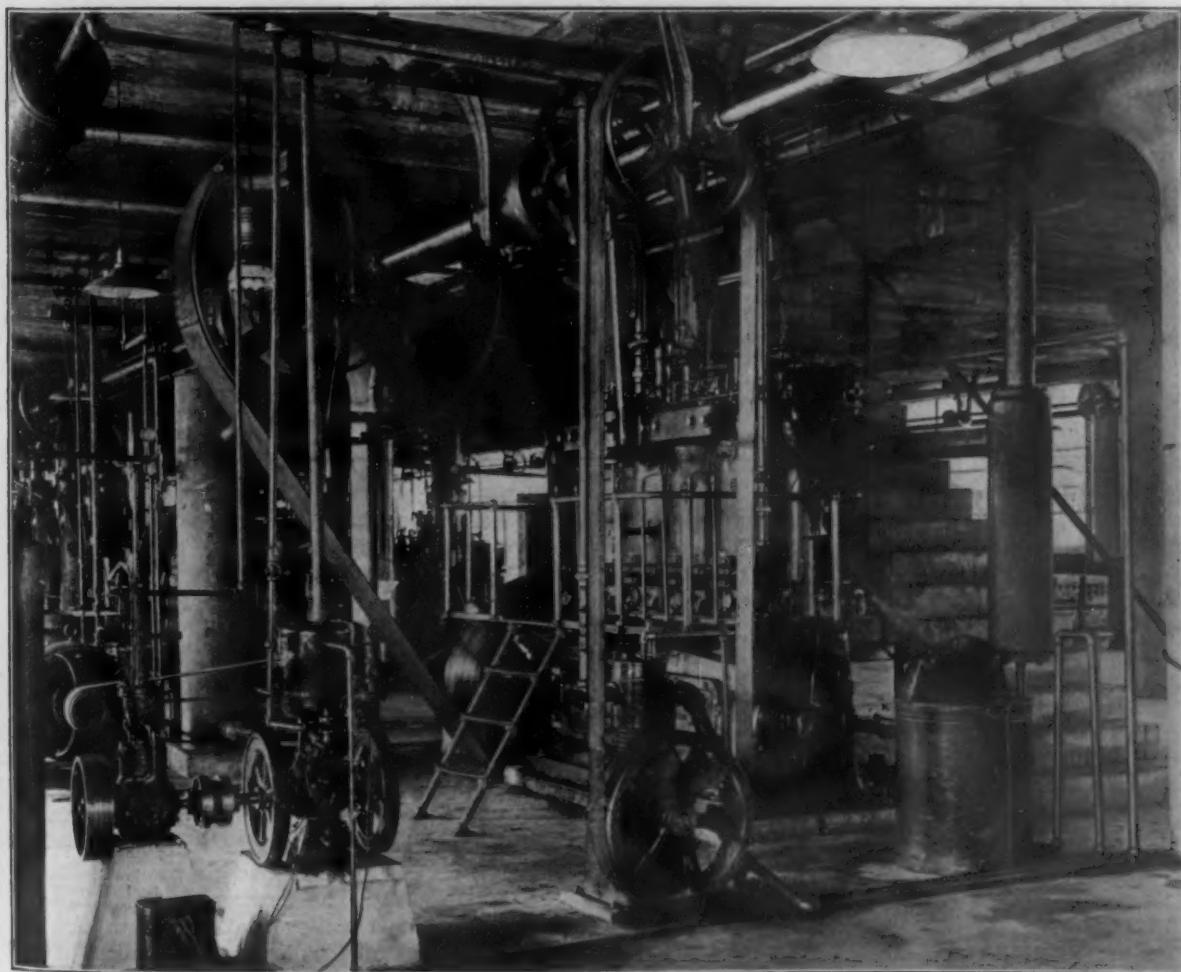
Gas Engine Drive in Large Machine Shop

Installation in Turner-Moore Plant at
Detroit to Cut Power Cost—Water Jacket
Heat Converted Into By-Product Steam

—BY F. L. PRENTISS—

OPERATING a large machine shop with a gas engine is a departure from the usual practice, and for this reason in particular the power plant installation in the new factory of the Turner & Moore Mfg. Company, Detroit, is of unusual interest. From the standpoint of economy there is an additional interest in this power plant because of the fact that the gas is not supplied at a specially low price but is costing the consumer 55 cents per 1000 cu. ft. In spite of this rather high rate the company decided that the cost would be lower with

gas than by installing a steam power plant or by purchasing electric current from a commercial lighting and power plant and states that its conclusions are substantiated by actual operation. At present, with considerable machinery to be installed, the engine is being operated at 75 to 80 per cent of its capacity; the plant is now using about 115 hp. and is consuming 1800 to 1900 cu. ft. of gas per hour, making the cost considerably less than it would be were steam power or electric current from a commercial circuit used. The heat ordinarily lost



The Main Gas Engine Is Located in the Center of the Shop on the First Floor with a Smaller One Operating an Air Compressor for Starting It. The Larger Air Compressor for the Cleaning System, the Lighting Dynamo and the Steam Process Tank Are All Grouped Around It

through the cylinder walls of the engine becomes a by-product and is used in the form of steam for heating a soda kettle and will also be used for providing the domestic hot-water supply. The power is furnished by a 150-hp., four-cylinder vertical gas engine located directly in the center of the first floor of the plant.

The plant occupies a two-story standard reinforced-concrete building of the flat slab type, 325 ft. long and 75 ft. wide, the most modern practice being followed in its design and arrangement. It is divided into four bays by 16-in. round concrete columns spaced on 18-ft. 9-in. centers. The ceilings are 12 ft. 6 in. in height. The floors are of 8-in. concrete slabs, the building being designed to carry a second floor load of 175 lb. per square foot. A basement 19 x 75 ft. is provided at each end, one

side of the centrifugal pump, and a constant circulation is maintained between the cylinder jackets and the tank. A pressure of 4 to 5 lb. is maintained on the tank and the pressure on the cylinder jackets is about 25 lb., this higher pressure being due to the resistance caused by forcing a large volume of water through the jackets rapidly.

The power plant equipment includes in addition to the gas engine and centrifugal circulating pump, a small Novo gas engine operating an air compressor for supplying two small air tanks on which a 250-lb. pressure is maintained for starting the engine on air pressure, an air compressor that provides the air supplied for cleaning work and for water compression of cylinders, this being belt driven from the lineshaft, and a dynamo driven from the crankshaft for providing current for the



The Main Lineshaft Is in the Center of the Second Floor and Transmits Power to the Lineshafts in the Other Three Bays Through Belting

basement section being used for lockers and a wash-room and the other for the heating plant. Continuous window space is provided between the curtain walls extending from about 4 ft. above the floor to the ceilings. The entire plant is used for machine work in connection with automobile parts, the first floor being devoted to cylinders and crank-cases and the second floor being used for machining smaller parts.

The gas engine, which was furnished by the Bruce-Macbeth Engine Company, Cleveland, is provided with apparatus for utilizing the heat of the jacket water according to the Meriam steam process, illustrated in *THE IRON AGE*, Oct. 1, 1914. A closed circulating system is provided which includes a centrifugal pump that forces the water over the engine cylinder walls at a high velocity to prevent the formation of bubbles on the surface of the cylinder jackets and thus promote the flow of heat or the cooling effect of the water. The water passes into an inclosed tank, which is connected to the suction

lighting circuit. The steam process tank is 20 in. in diameter and 8 ft. in height. Adjoining the tank is a soda kettle which is heated by steam coils from the tank. Although only one soda kettle is used at present it is stated there is sufficient steam to heat four or five similar ones. The steam not required is carried out through the side of the building by an exhaust line. The entire power equipment is compactly located, the smaller units and steam process tank being placed at the side of the large engine. A domestic water heater will be installed shortly and a portion of the by-product steam will be run through coils in this heater to provide a supply of hot water for the washroom.

The drive from the engine is from a 60-in. fly-wheel on the crankshaft that drives a 72-in. pulley on the lineshaft. The flywheel runs at 275 r.p.m. and the lineshaft pulley at 200 r.p.m. Adjoining the large lineshaft pulley is a smaller one that drives the main lineshaft on the second floor, the belt extending from this pulley up through the floor

to the lineshaft above. A clutch is located on each side of the lineshaft pulley so that either one or both ends of the main lineshaft may be run at one time. Three lineshafts in addition to the main lineshaft are provided in each half of the building on each floor so that the lineshafts extend the length of the building in the center of each bay. The lineshafts are cut in two at the center, making sixteen separate shafts, any or all of which may be in operation at one time. The belt drive from the main lineshaft to the lineshaft in the bay farthest away from the main lineshaft requires a long belt as these two shafts are on 37-ft. centers. The lineshaft hangers are attached to short stringers as shown in the second floor illustration, instead of having continuous stringers as is the general practice. The main lineshaft is 3 12/16 in. in diameter at the driving pulley and tapers down to 2 3/16 in. near the ends.

The plant is arranged for the convenient handling of material. There is an elevator at each end, one 8 x 14 ft. and the other 5 x 8 ft. At the rear of the shop is a railroad siding and a concrete loading platform, the latter being on a car floor level and extending into the plant 4 ft. above the first floor level. One of the elevators adjoins this platform, making it convenient for the handling of material to and from the platform. This elevator serves the basement where the heating plant is located, in addition to the first and second floors.

Chill Molds for Non-Ferrous Castings*

Three materials are available for chill molds for non-ferrous metals, viz. cast iron, steel and malleable iron. Of these the most satisfactory is cast iron. With cast iron molds a generous allowance should be made for machining the casting and also for the removal of surface defects. For small castings the thickness of the walls of the molds need not exceed 2 in., but should be increased with the size of the casting. The iron most successfully used for molds had the following composition:

Table 1—Composition of Iron for Chill Molds

	Per Cent
Combined carbon	0.84
Graphitic carbon	2.76
Silicon	2.62
Sulphur	0.07
Phosphorus	0.89
Manganese	0.29

The high phosphorus is justified by the sharper outlines produced in the castings. Iron high in combined carbon would probably grow and become deformed under repeated heating. It is to be remembered that phosphorus increases the brittleness, and a cast iron of low phosphorus may be preferable, even at some sacrifice in the sharpness of outline.

Steel cores are preferable to sand cores in chill molds. The gate must be designed with care, as the rapid chilling effect of the iron mold permits of little or no constriction at the junction of the head and the casting. Otherwise the metal is likely to set at this point before the feeding has been completed. A sand gate made in a detachable ring attached firmly to the top of the mold has given satisfactory results. The lower thermal conductivity of the sand enabled the smaller head made possible by this method to do all the feeding. A small riser was also used to secure free egress of air and gas from the mold. In one experiment the weight of the head was only 8 per cent of the weight of the casting.

To protect the surface of the mold and to facilitate the extraction of the casting, a coating of seal oil mixed with fine plumbago was found to be satisfactory. Just sufficient coating is required to form a gaseous envelope between the casting and the mold to give a clean surface to the former, in order to facilitate its extraction from the mold. If carbonaceous coatings are undesirable, an

emulsion of bone ash and water applied to the surface of the mold with a brush will give good results.

The elimination of dross from the surfaces of brass castings in chill molds has proved to be the greatest difficulty. The position of the mold has some bearing on the problem. The best way to secure clean casting is to prevent all dross and oxide from entering the mold. A suitable flux which will dissolve zinc oxide is useful. Aluminum added to copper-zinc alloys has a more marked effect in checking oxidation of the zinc than any other deoxidizer.

Table 2 compares the properties of alloy castings made in sand and chill molds respectively, and shows the superiority of those made by the latter process.

Table 2—Comparison of the Physical Properties of Alloys Cast in Sand and Permanent Molds

Composition	How Cast	Yield Point Tons Per Sq. In.	Breaking Stress, Tons Per Sq. In.	Elongation, Per Cent	Reference
Copper, 85 per cent; aluminum, 5 per cent..	sand	4.3	18.1	75.0	Eighth report of the alloys research committee, 1907
Copper, 85 per cent; aluminum, 5 per cent..	chill	7.1	18.1	60.5	
Copper, 90 per cent; aluminum, 10 per cent.	sand	11.3	31.7	21.7	
Copper, 90 per cent; aluminum, 10 per cent.	chill	12.4	36.93	30.5	
Copper, 88 per cent; aluminum, 10 per cent; manganese, 2 per cent.	sand	13.2	34.44	24.0	
Copper, 88 per cent; aluminum, 10 per cent; manganese, 2 per cent.	chill	16.8	37.0	25.0	Ninth report of the alloys research committee, 1910
Copper, 56 per cent; zinc, 41 per cent; iron, 1.5 per cent; tin, 0.9 per cent; aluminum, 0.45 per cent, and manga- nese, 0.15 per cent..	sand	...	33.44	20.0	
The same alloy as given above	chill	...	38.4	25.0	

The Most Desirable Size of Sand Blast Sand

A recent inquiry addressed to a number of manufacturers and large users of sand blast apparatus brought out the fact that shot or grit mixed with the sand is not desirable because one is already round and the other will have the sharp corners rounded off very quickly, thus giving the effect of hitting the casting with a dull tool. One user of this type of machinery employs sand that will pass through a No. 10 mesh sieve, while one builder recommends that heavy grain sand only be used as a general rule, unless a fine finish is desired, in which case fine sand can be mixed in.

The location of the plant is a factor in determining the kind of sand that is used. Cape May sand, which can be obtained in different grades, is generally employed in the East, while in the Middle West very fine silica sand is employed with equally good results. Another user brings out the point that various types of machines require different grades of sand, a steel grit being used to better advantage with some machines than the sand, while in others it is out of the question to use the grit at all.

Oglebay, Norton & Co., Cleveland, have published a map of the Menominee iron range of Lake Superior. It is 21 1/2 x 42 in. and with the sectional and tract plotting gives in color the demarkation of the ore formation and the associated greenstone and other rock. The various districts are indicated—Menominee (including Iron Mountain, Quinnesec, Norway, Vulcan and Loretto), Florence, Crystal Falls, Iron River, Felch Mountain and Sturgeon River. The Iron River and Crystal Falls districts in particular have shown important developments in recent years.

The Industrial Corporation of Baltimore City, United States Fidelity and Guaranty Building, Baltimore, of which C. C. Pusey is secretary, has been so successful in securing new industries that its scope is to be enlarged. At a meeting to be held in September it is expected that the capital will be increased from \$100,000 to \$500,000.

*Abstract of a paper read before the British Foundrymen's Association, by F. Johnson.

New Method of Determining Factory Costs

Every Variable Considered — Ordinary Methods of Distributing Factory Expense Burden, the Author Holds, Do Not Take Account of All Factors

BY DR. WILLIAM KENT

THE troublesome problem of the proper distribution of expense burden has been a source of controversy among factory accountants for many years. In 1885, Capt. Henry Metcalfe published a most valuable book on "Cost of Manufactures and the Administration of Work Shops," which is now in its third edition, and is still considered a standard work. In that book he illustrated the forms of labor and material cards and the systems of keeping records that are still in vogue, but his method of apportioning the expense burden was that of the "man-hour," which is now commonly discredited. In the many books on cost accounting that have appeared during the past thirty years, numerous methods of allocation of burden are described, such as (1) percentage of cost of material; (2) percentage of direct labor cost; (3) percentage of "prime cost," that is, the sum of labor and material cost; (4) a fixed rate per man-hour; (5) a fixed rate per machine-hour, or machine rate, which Hamilton Church in his book on the "Distribution of Expense Systems," calls the "ichthyosaurus of expense systems, belonging to the Silurian epoch of shop accounting"; (6) Mr. Church's so-called "scientific rate" and supplementary rate.

Captain Metcalfe in describing the man-hour method says that the running expenses of a factory are incurred only to organize its labor for profit. The method is to divide the total general shop expense for the preceding year by the total number of hours of shop work done during that year, and thus to "obtain a load by which to increase the charge for each hour during the present year."

The method of distributing burden in proportion to direct labor costs is stated to be the best of all systems and the one generally adopted, in a book on "Factory Accounts," by Hathaway and Griffith, published as recently as 1910, by the American School of Correspondence, Chicago. Mr. Church's method with the supplementary rate is approved by Prof. Dexter J. Kimball in "Auditing and Cost Finding," Vol. 7, of the Modern Business Series of the Alexander Hamilton Institute, New York, but he treats all the systems impartially, showing both their advantages and disadvantages and showing that one system may be best for one kind of business and not for another.

The writer, in *Iron Trade Review*, Feb. 14, 1909, in a review of Mr. Church's book condemned the supplementary rate, saying it not only introduces great confusion in bookkeeping but may give the management erroneous ideas as to what the real shop efficiency is.

Most other authors agree in stating that all systems are imperfect, that the best one gives only an approximation of true costs, and that some systems are much worse than some others.

VARIABLE RESULTS GIVEN BY DIFFERENT METHODS

As an example of the different results that may be obtained as the apparent cost of the same job by using different cost systems, let us assume that there are three jobs, A, B, and C; A and B being single jobs on single pieces of material costing \$1,

while C is really ten different jobs on ten pieces of material of different shapes, the cost of the raw material for the whole ten adding up to \$1. The labor cost on A is five hours at 40 cents, on B ten hours at 20 cents and on C eight hours at 25 cents. In each case, the labor cost is \$2. A is worked by a high-priced workman with a vise, chisel and file; B by a low-priced man watching an expensive boring mill going around; C by a man with a small lathe.

By the man-hour method of distributing burden, the burden rate of the shop is 25 cents per man-hour, by the percentage on direct labor method the burden is 100 per cent, by the "scientific" machine-hour rate, the rate for A is 20 cents, for B 50 cents and for C 40 cents. By the three different methods, the burden then appears as follows:

	Man-hour	Percentage on Labor Cost	Machine Rate
A.....	5 × .25 = \$1.25	\$2.00	5 × .20 = \$1.00
B.....	10 × .25 = 2.50	2.00	10 × .50 = 5.00
C.....	8 × .25 = 2.00	2.00	8 × .40 = 3.20

Adding \$3 to each job for material and labor, we find that A costs from \$4 to \$5; B, from \$5 to \$8, and C, from \$5 to \$6.20, according to the system that is used in computing the cost.

All three systems are objectionable; both the man-hour rate and the percentage on labor cost, because they fail to take into account the difference in cost of machines and their cost for floor-space, power, depreciation, repairs, etc.; and the machine-hour rate in that it fails to take into account the fact that the cost of superintendence, clerk hire, transportation and certain other fixed charges have no relation to machine costs. The per cent on labor costs is especially objectionable in that it puts too high a burden on the work done by a skillful high-priced man and too low a burden on that done by a slow and unskilled man.

None of the three systems takes into account the fact that job C, which is in fact ten different jobs, may require ten times as much supervision on the part of the foreman and ten times as much time of the store-keeper and bookkeeper as either one of the other jobs requires.

From the statistical facts above given, how can we arrive at a cost figure of these three jobs which may be used in the inventory of finished material, or as a basis of predicting the future costs of jobs of the same kind, or as a basis on which we can fix the selling price?

THE VARYING INFLUENCE OF DIFFERENT PARTS OF THE BURDEN

It would appear that in an accurate, or in even an approximately accurate, cost system, certain portions of the burden, such as interest, depreciation, cost of floor space, cost of power and of supplies, and assistance given by the tool maker and by the foreman in keeping the machines running, should be distributed on the work done in the several machines by a machine-hour rate (not a uniform rate, but one which varies with the machine), and that this rate should be independent of certain other classes of factory expense which are not related to the cost of machines.

Of these other expenses, those relating to the purchasing and storing of material and to transportation, belong to material alone. Another portion of the expense seems to depend, or is properly apportioned to, the number of jobs that pass through the factory in a day. For example, if a man has ten jobs a day, he takes a great deal more of the foreman's time to prepare his work for him and see that he knows how to do it, and more of the time of the planning and cost departments, than if he did only one job in a day. Other parts of the total factory expense are related neither to machines nor to number of jobs nor to weight or cost of material, but are related to the number of men in the shop and the number of hours they work irrespective of their wages. That is, they are related to a man-hour rate.

It does not appear that any portion of the burden should be divided in proportion to direct labor cost, notwithstanding the fact that most factory accountants approve of this method of division. For example, suppose that in a certain factory it has been shown that the total annual burden equals the annual cost for direct labor. The burden charge then is 100 per cent of the direct labor cost. A job on which one man works for 10 hours at 20 cents per hour is charged with a burden of \$2, while another job, on which a more skillful man, requiring no more floor space, heat and light than the other, and not as much of the foreman's time, works at 40 cents an hour, has a burden of \$4 charged against it. It seems that the percentage-on-labor-cost method is wrong in principle, and that the only thing that can be said in its favor is that it is an easy method for the accountant.

There thus remain four separate parts into which the total annual burden should be divided, relating respectively to (1) material, (2) man-hours, (3) number of jobs, (4) cost of keeping machines in operation, including floor space, interest, depreciation, etc.

A PROPOSED METHOD OF DISTRIBUTION

The writer offers the following, tentatively, as a proposed method of distributing burden and figuring costs, taking a hypothetical case in which the total annual burden to be distributed is \$50,000, and in which the classification under four heads is made roughly in round figures:

Related to Man-hour		Related to Material	
Shop superintendent..	\$2,500	Storekeeper	\$1,500
Asst. superintendent..	1,500	Asst. Storekeeper...	500
Bookkeeper	1,500	Stenographer	1,000
Asst. bookkeeper.....	800	File Clerk	700
Blacksmith	1,000	Stationery and postage	500
Helper	700	Truckman	900
1 Laborer	600	Watchman	800
Millwright	900	Craneman	800
Helper	700	Laborer	600
Apprentice	600	Apprentice	600
Draftsman	1,500	Boy	400
2 Assistants	1,600	Interest and depreciation on \$20,000 stores, at 8 per cent	1,600
Boy	400	Interest on \$10,000 cash reserves at 5 per cent.....	500
Patternmaker	1,200		
Asst. patternmaker...	800		
	\$16,300		\$10,400
Related to Jobs		Related to Machine Rate	
Cost clerk	\$1,200	Tool maker	\$1,200
Assistant	600	Assistant	900
Planner	1,500	Oil, waste, and other supplies	1,200
2 Assistants	1,200	1 Foreman	1,200
2 Foremen	2,400	Interest and depreciation, taxes and insurance on machinery, \$50,000, at 13 per cent.....	6,500
	\$6,900	On real estate, \$20,000 at 9 per cent.....	1,800
		Power	7,500
		Light	480
		Heat	840
			\$21,620

Totals	Less Charged Directly to Jobs	To Be Distributed in Proportion to Man-hours, Material, Jobs, Machine-hours
\$16,300	\$1,300	\$15,000
10,400	1,400	9,000
6,900	900	6,000
21,620	1,620	20,000
\$55,220	\$5,220	\$50,000

The statistics of the preceding year, a year of normal business activity, showed that there were 250,000 man-hours of direct labor; also 250,000 machine-hours (considering any place where a man worked, whether a machine, bench or floor, as equivalent to a machine); 100 men, 300 days in the year, averaging four jobs per man per day = 120,000 job cards per year; material \$60,000 per year. Dividing the several burden costs by these figures we have:

Man-hour cost, \$15,000 ÷ 250,000 = 6 cents per man-hour.
Job cost, \$6,000 ÷ 120,000 = 5 cents per job card.
Material cost, \$9,000 ÷ \$60,000 = 15 per cent (average).
Average machine-hour cost, \$20,000 ÷ 250,000 = 8 cents per machine-hour (average).

The machine-hour cost would range from 4 cents (a floor or bench space) to 60 cents, depending on the class and size of the machine and on the number of hours it runs in a year. Some machines might run 80 or 90 per cent of full time, and others, such as key seaters, broaching machines and hydraulic presses, only 5 or 10 per cent. A list of machines, benches, etc., should be made and the proper charge per hour for their use calculated, taking into consideration their cost, depreciation, and repairs, and the floor space, power, light and heat required for them, and also the number of hours per year they are expected to run. The material cost, averaging 15 per cent, may be classified and converted into different rates for different classes of material, as, for example, iron castings 15 per cent, forgings 10 per cent, steel bars and plates 20 per cent, brass and copper 3 per cent.

It may seem that this system of distributing burden is more complicated and may require more clerical work than any of the other systems, but it may be made no more complicated than the old machine-rate system. It requires the same preparatory work of listing the machines and establishing their hourly rate, and the extra calculation required on the job card for obtaining the cost is a mere trifle. Thus a card on the ordinary machine-rate system would have on it:

Hours	×	rate	Labor cost
10	×	.25	\$2.50
Burden rate 19,	Burden		1.90
			4.40

while on the combination system it would have

Hours	×	rate	Labor cost
10	×	.25	\$2.50
Burden rate	Job	M-hr.	Mach.
Burden amt.	.05	.60	1.20
			1.85
			4.35

The figures 0.05 and 0.06 could be printed on the card, for they would be constant for a year; the figure 0.12 would be obtained from a card showing the machine-hour rate for the different machines in the factory. The only extra clerical work actually needed would be multiplying the hours by the man-hour rate, writing down 0.60 and adding together 0.05, 0.60 and 1.20.

The calculation may be made still shorter by omitting from the card the man-hour rate, 0.06, and adding this figure once for all to the figures on

the list of machine-hour rates. The burden figures then will be

Job	Mach.	+ Man-hour	Total burden
0.05		0.18	
		1.80	\$1.85

For statistical purposes, however, it is well to keep the man-hour rate separate from the machine-hour rate so that the total charges for each rate on all the cards for a given period may be compared with the actual expenditures for burden, and so that the total charges for each rate on two jobs of the same kind done at different times may be compared with reference to the two kinds of burden. For example, suppose this same job were to be done on a more expensive and faster running machine, whose hourly burden was 20 cents instead of 12, and the job was done in 8 hours instead of 10. The card would show

Hours	× rate		Labor cost
8	.25		\$2.00
Job.	Man-h.	Mach.	Total burden
	0.06	0.20	
0.05	0.48	1.60	2.13
			4.13

The cost is 22 cents lower on account of saving on the labor cost and on the man-hour burden, notwithstanding the higher machine burden.

The writer believes that the proposed system, which he calls the "combination system" until a better name can be found for it, is a more accurate method of distributing burden than any of the methods described in the books. He hopes before long to elaborate it in greater detail, and in the meantime he will be glad to receive any comments upon it.

Britons to Prepare for After-War Conditions in Iron and Steel Industries

To consider the position of the iron and steel industries after the war, especially in relation to international competition, the following committee of the British Board of Trade has been appointed: G. Scoby Smith, chairman; Sir Hugh Bell, Bart.; Archibald Colville, Dalzell Steel & Iron Works, Motherwell, Scotland; John Hodge, M.P.; James Gavin, George Mure Ritchie, Henry Summers, Benjamin Talbot, John King, and John E. Davison, Lanarkshire Steel Works, Motherwell.

To carry out its investigations, the committee plans to secure detailed information from a number of representative and individual firms, and from industrial, commercial and labor organizations, with respect to:

1. The extent and area of trade, and capital normally employed.
2. The dependency upon resources external to this country for supplies of material and plant.
3. Labor relations, labor restrictions (if any), and comparative conditions in the industry.
4. British methods of conducting foreign business contrasted with foreign methods of conducting export business.
5. The effects of manufacturing and commercial co-operation upon trade at home and abroad.
6. The extent to which British industry is adversely affected whether as regards (a) the retention of business hitherto or previously secured, or (b) its capacity for expansion, by the existence of foreign tariffs, preferential arrangements, bounties, subsidies, or special facilities granted by foreign governments, railroads, or trade combinations, to their manufacturers or exporters.
7. Terms of payment and of credit.
8. Technical education, skill, and nature of employees.
9. The effect, if any, of rights-of-way and mining or other royalties upon the industry, either as regards home or export trade.
10. The effect, if any, of railroad and shipping rates upon the industry, as regards home, or export trade.
11. General information.

The Oregon Industrial League, Portland, Ore., is to begin a campaign to secure additional manufacturing enterprises. The sum of \$500,000 is being raised for loan purposes.

Chemists and Technical Men to Meet

The American Chemical Society will meet in New York, Sept. 25 to 30, in conjunction with the Second National Exposition of Chemical Industries. Dr. Charles H. Herty, of the University of North Carolina, president of the society, will open the exposition on Monday, Sept. 25, at 2 p. m., with an address reviewing the history of chemistry and the chemical industries in this country and outlining developments since the outbreak of war in Europe. The presidents of co-operating societies, such as the American Electrochemical Society, the American Institute of Mining Engineers and the American Paper and Pulp Association, will follow Dr. Herty with speeches of welcome and reviewing the progress made in the industries represented by them.

The first general session of the American Chemical Society will open at Columbia University on the following morning. Arrangements are being perfected for a public meeting in the large hall of the College of the City of New York in the afternoon, when addresses will be made of general public interest pertaining to the interesting developments in the field of applied chemistry during recent years. The program of the week's meetings will provide for general conferences on subjects in which the chemists of the country are now interested and it is intended that the lecture hall of the Grand Central Palace and Rumford Hall in the Chemists' Club building will be occupied each afternoon at the same time by one or other of the different divisions of the society for the discussion of such industrial topics as the production of dyestuffs, medicinal chemicals, industrial alcohol, the manufacture of paper pulp and by-products, oils and motor fuels, glassware and porcelain, steel alloy metals, new developments in chemical industries, etc.

The American Electrochemical Society has also planned a series of interesting meetings. The electrochemical group will open its meeting later in the week, on Thursday, with a technical session devoted to a review of American progress in the electrochemical industry. One of the sessions will be devoted to "Made in America" products of the electric furnace and electric cell. These products include many of our most important staples, such as copper, aluminum, abrasives, bleaches, graphite, magnesium and ferrosilicon and other alloys. A complimentary smoker will be held on Thursday evening and on Friday evening there will be a joint subscription banquet at the Waldorf-Astoria of the members of the American Chemical Society, the American Electrochemical Society, and the Technical Association of the Pulp and Paper Industry. Further information can be obtained from Allen Rogers, chairman Press and Publicity Committee, Pratt Institute, Brooklyn.

Great Britain to Help Finance Italian Trade Development

The British-Italian Corporation, Ltd., has been formed to develop trade between Great Britain and Italy, with a capital of £1,000,000, which has been subscribed privately, chiefly by banks. The British Government agrees to contribute to the company, by way of subsidy, in each of the first ten years after its incorporation, the annual sum of £50,000, or the equivalent of 5 per cent on its paid-up capital. The company, on its part, agrees to pay to the government amounts equal to any dividend, above accumulated dividend of 5 per cent per annum, which the directors may distribute to the shareholders in any year. The repayment of contributions to the government is to terminate when the government has received the amount paid by way of subsidy to the company, but without interest. The counterpart of this British corporation is to be a company in Italy, formed under the Italian law, with a capital of £400,000, one half of which is to be taken up by the British-Italian Corporation, Ltd., and the other half by the Credito Italiano and its friends. The British directorate is to include representatives of British banking and industry with three representatives from Italy, and, similarly, of the nine directors of the Italian company three will be British.

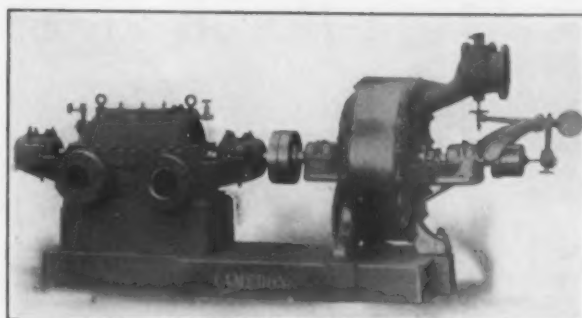
Three-Stage Centrifugal Boiler Pump

Orders for several of its three-stage centrifugal boiler feed pumps with direct-connected steam turbine drive have been received by the A. S. Cameron Steam Pump Works, 11 Broadway, New York City, from the United States Government. The pump can operate at the speed of the turbine, 3100 r.p.m., it is explained, because of the design of the impeller, in which the vanes are brought well down into the hub.

As will be noted from one of the accompanying illustrations, the casing is divided horizontally along the center line. The upper half is readily removable, thus giving access to the revolving element and both the suction and discharge connections are in the lower portion of the casing. The inlet and outlet nozzles in the pump illustrated are on the same side of the casing, which is an advantage where the space available for installation is limited, although if desired the nozzles can be placed on opposite sides. Openings for draining the pump and for displacing the air when starting are also provided in the casing.

The shaft is a steel forging finished by grinding and protected by bronze sleeves where it comes in contact with the water. This arrangement is relied upon to prevent the stuffing box packing from scoring the surface of the shaft. The impellers, which are of the inclosed type, are each a one-piece casting. The vanes are brought well down into the hub, thus, it is explained, giving small external diameter and the desired length of vane. They are also turned to guide the incoming water smoothly and with little loss into the other portion of the vanes where the velocity is generated that is finally converted into useful pressure by the external diffusion vane. Each impeller hub is surrounded by two rings, one of which is attached to and revolves with the impeller, while the other, which is attached to the casing, is stationary. This arrangement is relied upon to restore the tightness of the joint between the low and high pressure sides of each stage without employing a special fitting. The diffusion ring surrounding the impeller at its periphery contains a series of openings, the areas of which slightly increase toward the periphery. In this way, it is explained, the water is received from the impeller at high velocity, which is reduced to pressure, and advanced to the next impeller with little loss of energy.

An internal hydraulic balancing device, consist-



A Three-Stage Centrifugal Boiler Feed Pump Having a Capacity of 550 Gal. Per Minute, Which Is Driven by a Direct-Connected Steam Turbine at 3100 r.p.m.

ing of a revolving disk attached to the shaft at the high pressure end opposite a stationary drum of the same diameter, is provided to take care of the thrust. The space between the disk and the drum is filled with water at high pressure, which it is pointed out causes the former to react against the thrust, neutralizing it and holding the rotor in proper relation to the casing. The slight amount of leakage involved in this process is piped back to the suction. Two self-aligning bearings equipped with ring-oiling devices are provided, one on each side of the casing. The bodies of the bearing, which have removable caps, and the bushings are split horizontally. Brackets cast integral with the lower casing support the bearings and are relied upon to counteract any tendency toward vibration. Felt washers are employed to prevent the escape of oil from the chambers in the bearings and space is left between the brackets and the stuffing boxes to provide for the adjustment of the gland in each box. Water seals, consisting of a lantern gland in each box connected to the water from the discharge side of the pump, are provided. Swing bolts with which the gland is fitted provide quick and easy access to the stuffing box.

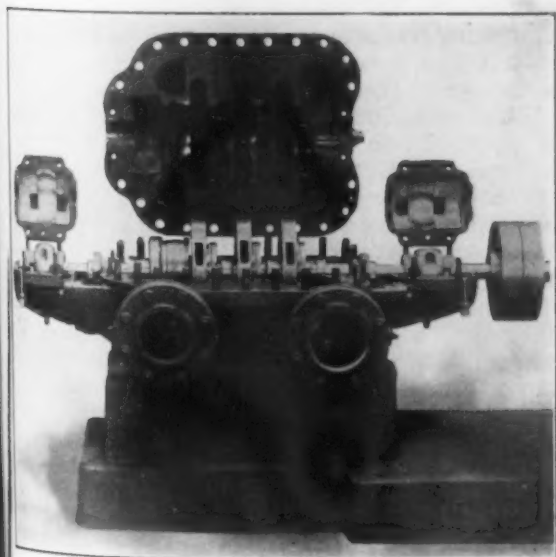
The bedplate used under the pump and the turbine is of one-piece box construction, reinforced by cross ribs. The connection between the shafts of the turbine and pump is made by a coupling of the flexible type, which enables any slight variation in alignment to be compensated for.

Failures of Crankshafts in Diesel Engines

That the engineer in charge is primarily responsible for the life of the crankshafts of Diesel engines is the opinion expressed in a paper read before the Diesel Engine Users' Association recently, according to the *London Times Engineering Supplement*. The paper states that certain reasonable and simple precautions will prolong the period of usefulness indefinitely. A number of failures cited in the paper were attributed to lack of alignment of the main bearings, which generally resulted from unequal wear of the several shaft bearings, although this same result was brought about in some cases by negligence in the erection of the engine, or to defective foundations in some of the older ones.

A four-cylinder engine is most likely to suffer shaft breaks, with the two-cylinder types having heavy flywheels, a close second. The shafts almost always fail through the throw arms, the crack starting at the center and working outward. With the four-cylinder engine the throw arm nearest the flywheel fails in most cases and this is also true of the two-cylinder units. Either throw of the single-cylinder type may fail and with a three-cylinder engine, which is the least likely to be affected, the failures are equally divided between the two end throws.

The American Brass Forging Company, Inc., will remove its offices on Sept. 1 from 120 Broadway to its plant at 168 Southern Boulevard, New York.



The Internal Parts of the Pump Are Rendered Readily Accessible by Raising the Cover

Iron-Boron and Iron-Carbon Alloys

Russian Comparison Giving the Properties
and Preparation of the New Compounds
as Well as Their Equilibrium Diagram

A PAPER taken from the *Journal of the Russian Metallurgical Society*, 1915, has just reached this country which gives an account of work done on the iron-boron alloys, at the Tomsk Institute of Technology, Tomsk, Siberia, by Prof. N. Tschishewsky and A. Herdt. While the whole field is not thoroughly covered the results obtained are very interesting, particularly as showing a similarity between these alloys and those of iron and carbon. This similarity was expected to some extent in the case of boron which exhibits many of the properties of carbon and occurs close to the latter in the periodical classification of Mendelejeff.

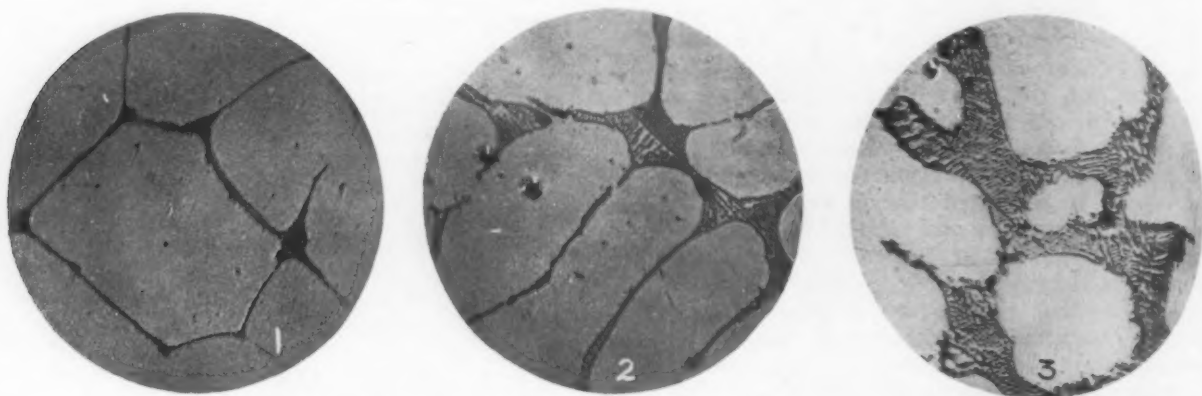
PREPARATION OF THE ALLOYS

As in work by previous investigators it was found that pure amorphous boron could not be used because of its rapid oxidation. After a series of

The investigation of the cooling curves was not carried lower than 650 deg. C. because several experiments with alloys containing different amounts of boron down to 270 deg. C. all showed completely smooth curves below 650 deg. C. Separate cooling curves need not be given, because the data found is brought together in the equilibrium diagram.

ANALYZING FOR BORON

The paper then gives in detail the method used to determine the boron in the alloys. It is volumetric and is very similar to that used by Prof. H. Moissan, modified by that of L. C. Jones. Further analysis of the alloy is not given, the work in this respect being therefore open to criticism. Apparently mechanical tests of the alloys were not made, but the microstructure was carefully examined, picrate of sodium being used as the etching medium.



Photomicrographs of Iron-Boron Alloys. Fig. 1 is from an alloy containing 0.33 per cent boron; Fig. 2, from one having 0.61 per cent boron, and Fig. 3, from one which showed 1.21 per cent boron. They are slightly reduced from an original of 250 diameters for Fig. 1 and 350 diameters for Figs. 2 and 3

preliminary experiments with various protective gases the best method was found to be the use of ferroboron, containing a large percentage of boron. In this way oxidation does not take place as easily and the melting proceeds much more quickly. The materials used were Swedish nail iron, containing carbon, 0.1 per cent; manganese, 0.14 per cent; sulphur, 0.012 per cent; phosphorus 0.008; and silicon 0.014 per cent; as well as the ferroboron. The full analysis of the latter is not given but it contained 23.69 per cent boron, and very small amounts of other impurities.

Melting was carried out in a porcelain tube in a Tammann furnace, the amounts of ferroboron required being added in pea-size to the molten iron. The charge in each case was 100 gr. (0.22 lb.), with the intention of having enough material for chemical and metallographic examination and mechanical tests. After the necessary temperature was obtained (1500 deg. C. up to sometimes 1550 deg. C.) the metal was thoroughly stirred with a silica rod. Further heating was then stopped and the alloy cooled slowly in the furnace. By means of special insulating arrangements the time of cooling to 650 deg. C. took about 30 to 35 minutes. A carefully calibrated Le Chatelier pyrometer was used, and cooling curves obtained with a recording apparatus of Professor Kurnakow.

A pearlitic constituent is found even with as little as 0.08 per cent boron. In these slowly cooled alloys it is even more marked, in pearlitic effect, than that of ordinary carbon steels. It may be called boric pearlite. Figs. 1 to 6 show how it increases. Fig. 5 is said to be characteristic of the alloys close to the eutectic ratio, the ferrite being found in fir-tree like crystals. The eutectic alloy, shown in Fig. 6, contains about 3.1 per cent boron, the average of three analyses giving 3.11 per cent.

With further increase in the percentage of boron free boride of iron is found, often in beautiful crystals, as shown in Fig. 7. As the boron increases to more than 8 per cent it is extremely difficult to prepare sections, the crystals of boride are only loosely held together by the eutectic. The alloy with 8.5 per cent boron is so brittle that it can be crumbled in the fingers. This boride is extremely insoluble in boiling hydrochloric or sulphuric acids whether strong or dilute. By heating a sample containing 8.85 per cent boron for two days, with twice normal hydrochloric acid, crystals were obtained having a steel-gray color. Three determinations showed them to contain 8.39 per cent boron, while theoretically the boride Fe_2B should have 8.96 per cent.

When more than 9 per cent boron is present, the alloys show a differentiated structure, with better mechanical properties. It is however very diffi-



Photomicrographs of Iron-Boron Alloys. Fig. 4 is from an alloy containing 1.84 per cent boron; Fig. 5, from one having 2.90 per cent boron, and Fig. 6, from one which showed 3.10 per cent boron. They are all slightly reduced from an original diameter of 200 for Figs. 4 and 5 and of 750 for Fig. 6.

cult to prepare sections, and no photomicrographs are given. The alloys with more than 11.5 per cent boron could not be investigated because of their very high melting point. Pyrometer tubes of electro-quartz softened while being sunk in the molten metal.

THE EQUILIBRIUM DIAGRAM

From the results of the thermal, chemical and micrographical analysis an equilibrium diagram was plotted as is shown by Fig. 8. A eutectic alloy is formed with 3.1 per cent boron. The ferrite portion of this eutectic is a solid solution of Fe_2B in iron, containing only about 0.08 per cent boron. In the area AEB there may be noticed a transformation in the alloy, proved by a series of points on the line kz , and shown by a slight evolution of heat during cooling. It is probably caused by the change of the iron from the gamma to the beta condition.

The point C corresponds to the crystallization of the compound Fe_2B , and with further increase in the amount of boron a eutectic $\text{Fe}_2\text{B}-\text{FeB}$ is observed. Below the period of solidification some transformations were noticed as shown by the lines GS and PK . The heat effect of these changes was very small and some of the arrests could hardly be noticed. This part of the diagram is to be more carefully explored in the future by still more delicate apparatus, and results published later.

G. B. W.

Contract for the construction of six barges, each 207 x 305 ft., and equipped with coal-handling devices, has been received by the recently formed Coastwise Shipbuilding & Lighterage Company, Locust Point, Baltimore, from the Philadelphia & Reading Railroad Company. It is stated that only wooden vessels will be built by the company.

Workmen's Compensation Increases Malingering

That the effect of the workmen's compensation act in Great Britain has been to increase the malingering of workmen who were but slightly injured is the conclusion reached in a paper read by Sir John Collie, M.D., before the Assurance Medical Society and the Medico-Legal Society. The paper is commented on in the *Engineer*, of London, of July 28.

With similar numbers employed in 1908 and 1913, the total number of fatal and non-fatal accidents has risen from 326,701 to 472,408. Of these the increase in fatal accidents was only 7 per cent, while the non-fatal cases increased 45 per cent. The significant fact in this connection is the increase in the comparatively unimportant cases. Slight accidents, necessitating three to four weeks' absence from work, have increased 46 per cent, while very slight cases incapacitating the worker for but two to three weeks have increased 76 per cent.

The author of the paper lays this condition in part to the crudities of the compensation act itself. At present a worker does not draw compensation for the first seven days of his incapacity unless he is laid up for a period of two weeks or more. In the event of a worker receiving an injury that will incapacitate him for 12 days, entitling him to but five days' compensation, it is natural that instead of returning to work on the thirteenth day he should prolong his injury for two days more, and thereby receive compensation for 14 days instead of five. This contention is supported by the fact that in a large district where the practice has obtained for some time of paying compensation from the first day of injury, the total annual amount disbursed was less than would have been the case if payments had been made in strict accordance with the legal provisions.

The Maryland Culvert & Metal Company, Baltimore, has been incorporated by William M. Baker, 1031 Munsey Building, E. McClure Rouzer and Roland H. Brady, to deal in steel, iron, etc.



Fig. 7

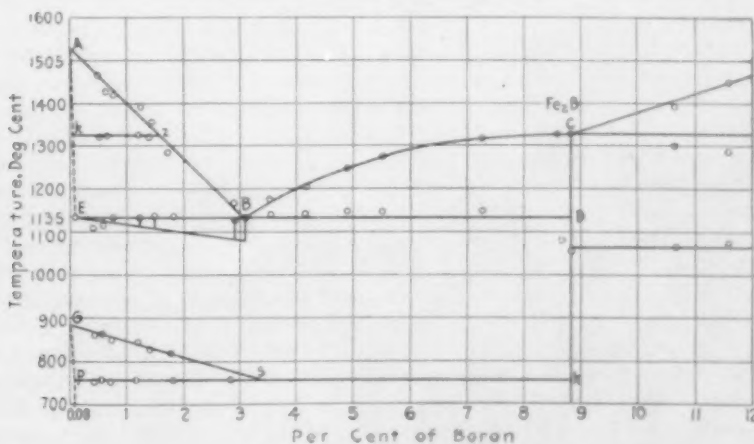


Fig. 8

Fig. 7 is a Photomicrograph of an Iron-Boron Alloy Containing 4.1 Per Cent Boron and is Slightly Reduced from an Original of 350 Diameters. Crystals of iron boride are visible. Fig. 8 represents the iron-boron equilibrium diagram.

Oxygen Gas in Blast-Furnace Operations

Examples of Its Effective Use in Opening Hard Tap Holes, Frozen Cinder Notches or Tuyeres That Are Plugged with Iron

—BY DAVID F. BAKER—

Oxygen gas under high pressure in cylinders, coupled with a very simple apparatus for using it efficiently, is to my mind one of the most efficient tools in use on any blast-furnace plant as an aid in keeping the furnace on time with its casts and in minimizing the extremely hard work attending the recovery of a furnace that for any reason has run off cold.

The apparatus in use on the blast furnace at the Broken Hill Proprietary Company's steel works in Newcastle, New South Wales, Australia, consists of two gages with a reducing valve between them, such as is used with the oxy-acetylene blowpipe, a heavy $\frac{1}{2}$ -in. rubber tubing about 30 ft. long with a $\frac{1}{4}$ -in. bend in one end, and a number of $\frac{1}{4}$ -in. pipes about 18 ft. to 20 ft. long. A sleeve is kept on the end of the bend not in the tubing, which allows of a quick connection with the pipe.

OPENING A HARD TAP HOLE

To describe the use of this apparatus we will take as an example a condition that every furnaceman has met with at times and which in extreme cases causes a good deal of anxiety, namely, a hard hole.

We have drilled in, say, with a hand drill until it seems as if we have struck a granite wall through which we are making very little if any headway. The drill is kept going until it is seen that it will mean possibly hours of work to cut through. Probably by this time we have struck a thick iron skull, though not necessarily so. The hole is very likely to show a dull red by this time. Then a container of oxygen, such as has been before described, is brought up and put at the side of the cast house where it will not be exposed to too much heat. The gages with the rubber tube attached are screwed into the proper place in the container and a $\frac{1}{4}$ -in. pipe will be connected to the bend at the other end of the rubber tube. Now we are ready to open the hole. If the hole is a bright red, it will probably be hot enough to cause the oxygen to set the end of the $\frac{1}{4}$ -in. pipe to burning and this will quickly burn the hole out. If the hole is too cold for this, a small coke fire may be started in the cinder run and the end of the pipe may be thrust into this and started burning in this way. Once started the pipe is quickly thrust into the hole and held up against the skull before it stops burning. It may take a number of pipes before the hole is burned through for, of course, the pipe quickly melts off, but it practically never fails to bring the iron.

It must be kept in mind that the $\frac{1}{4}$ -in. pipe must be kept burning to have any effect. After one pipe is burned off the remaining short piece is unscrewed from the bend and another long piece is screwed on. This time, if the first pipe has failed to bring the iron, it is not necessary to light the end of the pipe, for there will be a certain amount of molten iron which has come from the first pipe lying in the hole. Therefore, the pipe will simply be thrust into the hole and the oxygen will be turned on. The pipe will immediately light up from the molten material lying in the hole. This is kept up, replacing the tubes as quickly as they are burned off,

until the hole is burned through; and it is a very bad case that will not yield to this treatment in 15 to 20 minutes.

I have used this apparatus to burn out a hole that has run a good deal of iron and has closed up again. Of course, here the hole is lying full of molten iron and the pipe burns up very quickly, but by quick work and frequent changes of pipe I have succeeded in reopening the hole. This, however, is a case that requires skillful handling.

It sometimes happens that a tapping bar is driven into the hole and cannot be withdrawn and becomes frozen into the hole. With this oxygen apparatus it is not even necessary to try to pull the bar off, leaving part in the hole as can be done with a gang of men pulling a ball against a ring and wedge. It is only necessary to get the oxygen apparatus to work, for when there is a clean iron or steel plug in the hole the oxygen burns it out in no time.

The apparatus works best, of course, where the hole is plugged with iron or at least where there is a big percentage of iron in the hole. However, I have at times burned through a foot or 15 in. of slag and clay, with very little iron if any in it, and have opened a hole in 20 min. to half an hour that by ordinary methods would have taken three to four hours of the hardest kind of work.

The tools that I have regularly used to open the hole consisted of an electric twist drill with which to open the hole to the skull and a hand drill operated by the whole furnace crew to punch through the skull, keeping the oxygen apparatus as the final word in case of trouble. With these tools the opening of the iron notch no matter what the condition of the furnace was always the least of my troubles.

OPENING A FROZEN CINDER NOTCH

A second use to which the oxygen was put, and very successfully, was that of opening the cinder notch. On every furnace I have ever seen there is trouble at times in getting into the cinder notch; and when a furnace needs to be flushed this is a very awkward thing to have happen. In such a case I have always been most successful with the use of oxygen. Care should always be exercised when burning out the cinder notch to avoid burning the monkey. If the pipe is entered carefully, so as not to touch the monkey, there is very little danger of injuring it. At times the skull in back of the monkey was just pure cinder, in which case my method was to have a sharp steel tapping bar ready, and after using the oxygen until the slag was at a yellow heat and just at the melting point, quickly pull out the pipe, enter the tapping bar and drive as quickly as possible. This method failed only where the slag would not run. Of course, if there was iron in the monkey the oxygen took care of it very easily.

At times, at the end of the flush just before cast, the furnace may slip or the notch begin to blow heavily, picking up the iron and throwing it heavily through the monkey. Then if the notch is stopped quickly, the monkey is quite likely to be plugged with iron. Such a case causes no trouble if this

oxygen apparatus be used, for when ready to flush again the notch may be quickly burned out, care being used, as said before, to enter the pipe properly.

Another use for this apparatus at the cinder notch is the following: In getting a furnace around after having chilled up the tuyeres, it is frequently necessary to cast through the cinder notch for awhile. When the furnace is normal again and it is time to put back the cinder coolers, a great deal of difficulty is frequently found in cutting out the clay and brick which were used to plug up the notch. I have found that the use of the oxygen apparatus has aided very materially when cutting that part which has been most subjected to the intense heat of the furnace and to the action of the slag and iron. This material has a good deal of iron run through it, perhaps not in large quantities, but at least in shots and veins. The oxygen attacks these shots and veins and tends to honeycomb the structure so that it is easier to cut it out.

A third and no less important use to which oxygen may be put is in burning out tuyers which have been plugged with iron. Let us suppose a case. The furnace has run off cold for one reason or another, and is very sloppy at the tuyers. Then by reason of a breakout or a tuyere burning, or any one of a dozen different things, it is necessary immediately to pull the wind off the furnace. Of course, the tuyeres are flooded, and of course the caps are immediately knocked open, and the blow pipes dropped as soon as possible, but in spite of this it is quite likely that some if not all of the tuyeres will be plugged with iron. Say that the pipes are down and a plug of iron is found in each of the tuyeres. One or more of these oxygen apparatuses are put to work, and in half to three-quarters of an hour each has succeeded in not only burning a hole through to the coke, but in cutting around the plug in the tuyere so that it can be pulled out or enough of it so that the remainder will be at the nose of the tuyere where it will quickly melt under the action of the blast. The hole that has been burned through to the coke is plugged with clay to keep any melting due to drafting through this hole from closing it again. Then replacing the blow pipes, the furnace may be started upon as many tuyeres as is deemed advisable, it being possible, however, to open all the other tuyeres at any time with the wind on by merely driving a bar through the clay plug. The advantage of this method in quickness over that of the ordinary oil blow pipe or even the electric arc is really amazing.

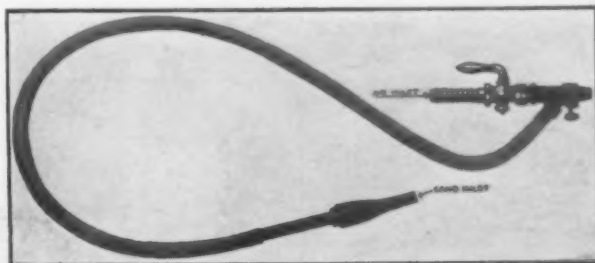
Another slightly different case might arise in that it might be found necessary for one reason or another to plug a tuyere and keep it plugged for some little time. In this case, very frequently when it is desired to open the tuyere again a more or less heavy skull will be found after cutting through the clay and brick bat plug. I have repeatedly found this skull so hard that it would turn the point of many steel tapping bars as I cared to drive into it without any effect on the skull. In such a case, a small coke fire is built on the floor near the tuyere, the pipe is started burning and then as soon as it is burning well the eyesight slide is knocked up, the burning pipe is shoved through the hole in the cap and up against the skull, cutting a hole through to the coke in a very few minutes and opening the tuyere without having to take the wind off the furnace. This, of course, is rather a ticklish thing to do because it is hard to put the end of the pipe through the hole in the cap without hitting the cap itself, in which case the pipe is snuffed out and you have to start over

again. Also very frequently the pipe is put out after it gets in by hitting the skull too hard at first. Still, if the skull is laid bare by chopping out as much of the clay plug as possible, and if a man holds the pipe near the end with a pair of tongs and guides it through the hole, with a little perseverance the tuyere can be opened as I have stated.

The secret of this apparatus is to my mind this: If oxygen is used as I have described on an open face of a size to allow of a great deal of radiation the result is failure; but if it is used in a pocket where the heat is generated much faster than it can be radiated or carried away, then an intense melting action takes place, the burning of the iron furnishing the heat.

A Suction Type of Sand Blast Nozzle

A sand blast nozzle employing the injector principle has been developed by W. F. Stodder, 218 South Geddes Street, Syracuse, N. Y. It is designed primarily for cleaning castings or parts in a foundry or similar plant,



A Sand Blast Nozzle Operating on the Same Principle as a Locomotive Injector and Designed as a Substitute for the Tank Generally Employed in Connection with the Cleaning of Castings in a Foundry

for removing scale from boiler tubes and boilers and removing rust and paint from structural steel, cars, bridges, etc. The special feature upon which emphasis is laid is that as the sand travels slowly through the hose there is little wear with a corresponding reduction in cost. An advantage claimed for the nozzle is that there is no sand tank to be filled.

The air pressures used with the nozzle are the same as those employed for other classes of compressed air work. To operate the nozzle it is simply necessary to attach the air hose, place the end of the sand hose, which it will be noticed is of special shape, in the sand pile or a pail containing the sand if that is more convenient, and open the air valve. The suction of the air passing the end of the sand hose produces a suction, as in the locomotive injector, and then serves to propel the sand through the tip and out against the work.

Painting of Iron and Steel Surfaces

A single coat of paint affords greater protection to iron and steel surfaces than two or more coats, according to an article in the *Railway Engineer* of June. This is due to the action of the paint in drying. Upon the application of a moderately thin layer of paint, it dries with open spaces around its larger granules. There are also tiny cellular cavities where free oil or globules of air have been present, narrow undergrooves and scattered particles of fairly large size. To all appearances the surface is hard and firm, while in reality this is not true. Upon the application of a second coat the surface is partially redissolved, and the under parts of the first coat are softened. The soluble granules are dissolved and fresh passages are opened up. The second coat, while apparently tight, has in reality made the first coat more porous, and the effect is increased by each succeeding coat. A single thick coat of paint laid on without too much brushing will afford better protection, as the larger particles sink to the bottom, the solvent flows above them, and the gradual oxidation prevents the formation of empty spaces.

Why American Water Pipes Are Best*

British, Canadian and American Products
Compared—What an Experience in Egypt
Brought Out as to Manufacture and Packing

BY PERCY G. DONALD†

RECENTLY, at the request of the British War Office, I bought pipes for the Government, and afterward undertook the laying of pipe lines in Egypt, a task which has proved most instructive of manufacturing and exporting methods. With many of the points disclosed in the course of the undertaking I was already conversant, and these, together with others that presented themselves, I now present with the sincere hope that in this trade as in others we may take time by the forelock and scrap systems of the obsolescence of which we have

early stage of unloading from the ship there was going to be a lot of trouble with damaged threads. The supplies from Britain came from different manufacturers, but with all of them the method of protecting the thread was of the crudest, necessitating over 15 per cent. of the pipes having the stocks and dies run over the thread, or being renewed entirely. In the case of 6-in. pipe, and when the only threading method available is handcutting and threading apparatus, this is a pretty serious matter.

The packing of Canadian pipe was quite as bad



Fig. 1

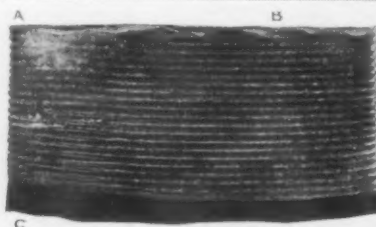


Fig. 2

Fig. 1—The usual method of packing British water pipe.

Fig. 2—A photographic reproduction of an end cut from a pipe damaged through relying on a useless protector. Note that the pipe is entirely knocked in on one side and that the damage to the thread at the end is most apparent. A, is the damaged end; B, the broken end; C, cross-threading.



Fig. 3

Fig. 3—Alternative method adopted by British manufacturers, the protector, which was supplied at an extra charge, being only a piece of a coupling cut off and screwed on the end of the pipe. This method effectually prevented the bending in of the pipe at the end shown in Fig. 2, but as will be observed the end of the thread on the pipe burred over making it very difficult to remove the protector and increasing the possibility of cross-threading when fitting the pipe into the coupling of the preceding pipe.

SOME BRITISH TYPES OF THREAD PROTECTION AND THE RESULT

prima facie evidence. I will divide the points under four headings:

1. Export Packing Methods.
2. Threads.
3. Manufacturing Methods.
4. Costs.

Probably the construction of this pipe line in Egypt is the only occasion on which opportunity has occurred of testing under equal conditions, side by side, British, American and Canadian pipe. The inaccessibility of the sites in which the pipe was laid necessitated manhandling for the bulk of the pipe, and this, with other conditions, normal and abnormal, gave opportunity of noting results such as no other job could have given. My remarks and general experience apply more to pipe in sizes running from 3 to 6 in. than to the smaller sizes.

EXPORT PACKING METHODS

Unloading was, of course, a preliminary to all other work. It was quickly seen that even in the

so far as protectors were concerned, but the proportion of damaged pipe was not so high, owing to the heavier character of the pipe itself. On the other hand, although at least three-fourths of the pipes laid were American, there was not a single instance of an American pipe having to be rethreaded or requiring to have its thread touched in any manner. The necessity for protectors that really do protect will be realized when it is stated that the American 6-in. pipes go 5½ to the ton and the British 7 to the ton. In such a job as that on which I was engaged in Egypt, pipes are not dropped gently to the ground. They are carried on three or four men's shoulders and thrown off from shoulder height, and this is repeated many times before the pipe arrives at the spot where it has to be laid.

This handling of 3 to 6 in. pipes is, however, by no means peculiar to the pipe line in question. Every manufacturer, when sending out pipes of such large diameters, should assume that they will be handled a number of times, and roughly at that.

VARIOUS METHODS OF PACKING

I will show by illustration the various methods

*From an abstract in *American Industries* of an article printed in the *Ironmonger* (London).

†Secretary Rowson, Drew & Clydesdale, Ltd., London, iron merchant.

of dealing with the difficulty. Figs. 1 and 3 show the most usual methods of packing British pipe. These methods are not only quite useless, but it is difficult to imagine any manufacturer with a knowledge of threads conceiving such a packing as shown in Figs. 1 and 3. In the packing shown in Fig. 1 not only was the canvas cut right through upon arrival, but as in unloading from a ship one end always touches the ground first, the method was responsible for the bulk of the damaged pipes (Fig. 2). The ends of these had to be cut off and the pipe rethreaded. This distinction was shared, in a lesser degree, by the Canadian pipe, of which the method of packing is shown in Fig. 4.

I now illustrate (Fig. 5) the protector found on the bulk of the American pipes. This protector consists of a sheet-steel stamping. It will be observed that there is very little threading on the protector. The first two threads fit easily to the pipe, and the last three bite hard, preventing the protector coming off on the journey, while for removing one turn with the wrench is sufficient, the rest of the removal being done by hand. The swelled-out part which

few days. The American pipes were filled in with a heavy fat mixed with blacklead, which even a hot sun did not melt.

THREADS

The foregoing remarks explain partly why one gang of men working on British pipe could only fit 756 ft. of 6-in. pipe in one day, and that figure was a record, while the same gang working on American pipe fitted well over double the length in the same time. The rest of the explanation is in the shorter length of the British pipes and the type of thread adopted by British makers. For $2\frac{1}{2}$ to 6 in. pipe the British standard is 11 threads, and the American 8, to the inch.

No doubt, when the British Engineering Standards Committee set up its standard pipe thread, some arguments must have been brought forward in recommendation of that thread, but, in view of my practical experience, I am tempted to think that the committee's decision may have been guided by the fact that the thread adopted was being largely used at the time by certain makers rather



Fig. 4

Fig. 5

Fig. 4—The narrow strip of thin hoop iron employed by Canadian manufacturers to protect the threaded end of the pipe and which performed its function in only a few cases, a large number of the bands being found loose in the steamer's hold when the cargo was unloaded.

Fig. 5—Typical protector found on the American pipes.

Fig. 6—Condition of the thread of the British coupling on arrival.

Fig. 7—An American coupling with recessed end.

CANADIAN AND AMERICAN TYPES OF THREAD PROTECTORS AND BRITISH AND AMERICAN COUPLINGS

does not screw down on to the thread takes the shock of any drop, and the turned-in portion at the top effectually protects the end of the thread from such trouble as shown in Fig. 3.

The end of the coupling next calls for attention. Fig. 6 shows the British method of making couplings and dispatching pipes. It will be observed that the thread is badly broken at the top, owing to the threading starting from the end of the coupling. About $2\frac{1}{2}$ per cent. of the British couplings were damaged in this manner. The Americans have an effective method of overcoming this difficulty.

The American coupling has the inside slightly bevelled before the thread starts, with the result that when the pipe is knocked about the thread is not damaged, as in Fig. 6.

This bevelling is clearly shown in Fig. 9. In the American pipe (Fig. 7) the coupling is invariably recessed, which effectually prevents any damage, but the bevelling above referred to is cheaper and quite effective.

The British pipes were sent out with the thread quite dry with the result that where they were not already rusted upon arrival, rust set in within a

than by consideration of what was the best thread for the purpose.

On a water test with the two threads on the same pipe line, it was possible to look at the defects in a comparative manner. Had the whole lines been of British thread, any defects shown might possibly have been ascribed to faulty threading or to insufficient use of red lead. In the case under review a considerable degree of contraction and expansion took place before the pipes could be buried. Owing to the lack of material and for other reasons, no arrangements could be made for expansion joints; in fact, such joints were unnecessary once the pipes were buried. Pending the burying there were a number of breaks, and in every case but one these were at a British joint, despite the fact that only about 25 per cent. of the pipes in the line were British. The one instance of a break in an American pipe was caused through a faulty coupling.

When water was pumped through, a very large proportion of the British joints leaked, but one could travel for miles along the American pipe without finding one leaking joint, and this notwithstanding the free use of red lead with the British

thread, while in many cases no red lead was used at all with the American thread.

THE RESULTS OF THE WATER TEST

The result of a close investigation made by myself is shown in illustrations, made from photographs. The pipes shown were all cut open at the same time.

Fig. 8 shows pins driven into the thread at the end of a British steam pipe. This was made possible because the pipe was tapered in the threading, but had the coupling straight. It is obvious that if a tapered screw thread is passed into a parallel coupling, a "bite" can only really be secured on one or two threads, where the diameter is largest. The remainder can only secure a partial "bite"—hence the openings which admit the pins.

The American threaded pipe, shown in Fig. 9, has one pin driven into the end thread. The remainder of the threads would not even admit a pin point.

CROSS-THREADING

With the British thread cross-threading is the hardest thing in the world to avoid when fitting

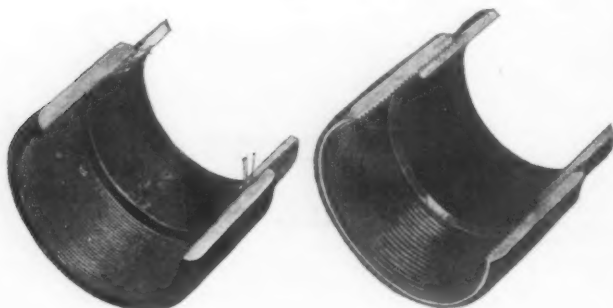


Fig. 8

Fig. 9

Fig. 8—Steam quality British pipe.

Fig. 9—American pipe used on an Egyptian pipe line.

pipes of from 3 to 7 in., and by no means easy to avoid when threading them.

It will be noticed that Figs. 2, 6 and 8 all show cross-threads. The British thread, while possibly suitable for 1 to 2 in. pipes, is, in fact, much too fine for large pipes. In endeavoring to fit together pipes with British thread on the Egyptian job, it was found that unless the pipes were started off exactly straight the only result was to cross-thread, and thereby ruin either the thread of the pipe that was being fitted or the coupling of the pipe that had already been fitted or both.

In laying a pipe line the static head and the friction head both have to be considered. The friction head is increased by obstructions or bends in the pipe, and when a burr such as is left on the British pipes (see Fig. 6) occurs every 18 ft., the matter is serious, especially when the pumps provided are only just equal to their work. That such a defect may jeopardize a whole scheme is shown by the fact that a large section of a job in London had actually to be taken out entirely through this cause.

This is a strong indictment, but when one undertakes work such as this Egyptian pipe line, possibly the largest of its kind, and hears British sappers and engineers, after experience with British and American pipe, cry with one voice, "Give us Yankee pipe"—one feels strongly on the point.

MANUFACTURING METHODS

Under this heading the question of standardization undoubtedly comes foremost. Britain has an Engineering Standards Committee, but that body

lacks the power of enforcing its findings. Its standard allows a "nominal" inside diameter and an "approximate" outside diameter for pipes, and any maker who complies with these two very elastic conditions may claim that he is making pipe to "British standard."

It is noteworthy that, although representatives of the Admiralty, the War Office, the railroad companies and the shipbuilders were serving on the committee, yet all these bodies, apparently convinced of the uselessness of the "British standard," set up their own special standard when asking for quotations!

In the United States standardization is on a very different basis, and owing to this fact the States can produce pipes of a higher quality and greater weight at prices considerably below those of the British manufacturer, although the latter gets his labor at about half the cost the American maker pays.

It will be seen that the American practice calls for a greater length of thread in the socket than does the British. This is a very necessary precaution. The fact that the United States pipe is tested to a higher pressure than our steam pipe is worthy of note. The main point, however, is that while our works are tinkering about with three different weights to manufacture, three different stocks to carry, and a costly system of painting to differentiate the pipes, the Americans have reduced their costs of manufacture by producing one pipe only, and a pipe that is apparently better than our steam and cheaper than our gas pipe.

American pipes are made in lengths of about 20 ft.; ours in lengths of 16 to 18 ft. As the cost of making a 20-ft. pipe is about the same as that of making one of 16 ft., they get a big pull over us here.

Apart from this specialization the American manufacturer will have nothing to do with fittings. He holds that the making of fittings is a separate industry altogether, and that his time is fully and most remuneratively employed in turning out pipe at the lowest cost by scientific manufacturing processes. Again, the American manufacturer does not want orders for less than a carload, or 16 to 18 tons.

Such a thing as a pipe manufacturer opening stocking branches to increase his "on costs" or running a number of small works is unknown in the United States. Indeed, the first thing that is done when a number of small works are amalgamated is to scrap the lot and build one large new works to manufacture on the most modern labor saving lines.

COMPARATIVE COSTS

Apart from the labor costs in America being nearly double ours, the distance from the American works to the shipping port is three to five times that of British works. The statement given below is based on the huge purchase for the British Government which I had to handle in December, 1915, and which for the sake of comparison I will place as amounting to £126,000, based on American discounts. All prices are f.o.b. The British makers' figures do not take into account the charge for thread protectors (see Fig. 3), which are supplied free with all American pipes.

		U. S. A.	British Combine*
December, 1915, purchase	{ Gas Water Steam }	£126,000	£180,000 197,000 217,248

*Allowance has been made for deferred rebate.

What better time than the present to create a proper standard, to scrap our absurd differentia-

tions between gas, water, and steam pipes, to scrap such unnecessary sizes as $\frac{5}{8}$, $1\frac{1}{4}$, $1\frac{3}{4}$, and $2\frac{1}{4}$ in., to adjust our threads for the larger sizes, to leave to the fittings manufacturer the job of turning out fittings at competitive prices, and to make our profits on low costs?

Up to the present the Americans have not got into other markets owing to the differences in their

threads. But what is to-day's position? The export of pipe to foreign countries is prohibited. This means that the greater part of the world is bound to go to America for this line, and where once the United States pipe and its thread are adopted the British opportunity of regaining the market would appear to be remote, unless the price and the goods are right.

Prices of Galvanized Sheets from 1898 to 1916

The table below gives the monthly average prices, f.o.b. Pittsburgh, in cents per pound, of galvanized sheets, as quoted in each week's issue of THE IRON AGE from the beginning of 1898 down to the present month. It has been a tedious task to compile these prices, as the quotations for many years were given in percentages of discount. It was the custom, in marketing galvanized sheets, up to a comparatively recent period, to observe the usage in the hardware trade of maintaining a standard list for the several gages, and, in making prices, to name a discount from this list. It was therefore necessary, in compiling the greater part of this table, to convert discounts into net prices. The undertaking was one which involved so much labor that work on it was only prosecuted whenever a favorable opportunity developed. Now that the compilation has been completed, we have no doubt that the table will be appreciated by those who have anything to do with selling or buying galvanized sheets.

Average Prices of No. 28 Galvanized Sheets, at Pittsburgh, in Cents per Pound

	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
Jan.	3.12	3.08	3.83	4.36	4.64	3.70	3.36	3.35	3.45	3.67	3.59	3.55	3.50	3.20	2.90	3.46	2.87	2.79	4.75
Feb.	3.06	3.62	4.09	4.36	4.36	3.70	3.25	3.40	3.45	3.75	3.55	3.51	3.50	3.20	2.87	3.50	2.95	3.16	4.75
Mar.	3.15	4.17	4.32	4.84	4.36	3.78	3.23	3.45	3.43	3.75	3.55	3.26	3.50	3.20	2.80	3.50	2.95	3.40	4.75
Apr.	3.10	4.25	4.78	4.84	4.36	3.89	3.23	3.45	3.40	3.75	3.55	3.25	3.50	3.20	2.86	3.50	2.91	3.29	5.00
May.	3.06	4.25	4.66	4.74	4.36	3.88	3.23	3.45	3.40	3.75	3.55	3.25	3.50	3.20	2.90	3.42	2.80	3.50	4.94
June.	3.06	4.52	4.59	4.59	4.23	3.81	3.18	3.35	3.55	3.75	3.55	3.25	3.50	3.00	2.90	3.38	2.75	4.28	4.69
July.	3.06	4.72	4.53	4.48	4.26	3.73	3.14	3.36	3.55	3.75	3.55	3.25	3.39	3.00	3.00	3.33	2.75	4.40	4.38
Aug.	3.10	4.85	4.43	4.74	4.18	3.66	3.14	3.32	3.55	3.75	3.55	3.25	3.30	2.99	3.12	3.24	2.85	3.71	4.21
Sept.	3.15	4.59	4.33	4.73	3.99	3.66	3.14	3.30	3.55	3.75	3.55	3.28	3.21	2.93	3.21	3.16	2.95	3.56	...
Oct.	3.15	4.53	4.25	4.55	3.87	3.73	3.14	3.30	3.58	3.75	3.55	3.35	3.20	2.85	3.36	3.08	2.95	3.50	...
Nov.	3.06	4.21	4.16	4.84	3.85	3.51	3.23	3.32	3.65	3.75	3.55	3.43	3.20	2.85	3.40	2.98	2.88	3.89	...
Dec.	3.06	3.88	4.36	4.84	3.78	3.40	3.31	3.35	3.65	3.75	3.55	3.50	3.19	2.89	3.40	2.90	2.78	4.75	...

The highest prices realized for galvanized sheets were obtained in April of this year, following the spectacular performances of spelter, when prices of that metal soared to an unprecedented height. At that time, No. 28 galvanized sheets sold up to 5.30c. per lb., Pittsburgh, or higher, although the average for the month is placed, in the table, at 5c. It is interesting to know that in 1901, in a period of great activity in the steel trade, No. 28 galvanized sheets were regularly quoted at 5.10c., Pittsburgh, for two weeks, namely, the first half of September. The lowest price realized, as shown by the table, was 2.75c., Pittsburgh, which price ruled in June and July, 1914. The price did not run below 3c., Pittsburgh, in the years covered in this table until 1911, although in 1893 it dipped close to that level.

American Foundrymen's Meeting

The tentative arrangement for the sessions of the annual meeting of the American Foundrymen's Association, to be held in Cleveland, shows that the first session will be held on Monday afternoon, Sept. 11, instead of having the meeting begin on a Tuesday morning, as has usually been the case. This year a one-meeting-per-day plan is to be inaugurated, and on this account the opening session had to be placed on Monday, owing to the crowded program, which will involve some forty papers and addresses and eleven committee reports. A number of simultaneous sessions have also been arranged. However, the only afternoon meeting is the opening session. The chronological order of events is as follows:

Monday, Sept. 11: 2.30 p. m., opening session.
 Tuesday, Sept. 12: 11 a. m., general topics; 3 p. m., ball game; 8.15 p. m., theater party.
 Wednesday, Sept. 13: 10 a. m., general topics; 2.30 p. m., inspection tour of the Cleveland Furnace Company's plant; 7.40 p. m., trip to Euclid Beach Park.
 Thursday, Sept. 14: 10 a. m., malleable session; 10 a. m., steel session; 7 p. m., annual banquet at the Hotel Statler.
 Friday, Sept. 15: 10 a. m., gray-iron session; 10 a. m., steel session.

Besides the tour of the Cleveland furnace plant, visits are planned to the plants of the Allyne-Ryan Foundry Company, the Ferro Machine & Foundry Company and the Westinghouse Electric & Mfg. Company.

The exhibition of foundry supplies and equipment and of machine tools and accessories will be held in the Coliseum, one block from the Hotel Statler. The 60,000 sq. ft. of floor space in this building proved inadequate to the needs and the erection of a temporary building has been made necessary, which will provide an additional 10,000 sq. ft. of floor space. In this annex will be located the large operating exhibits and this building will be converted into a model foundry.

On Aug. 15, 135 manufacturers had reserved space and the indications are favorable to an increase of this total to 150. Last year, at Atlantic City, 102 manufacturers were represented, and the Cleveland show will have a numerical increase of individual exhibits of nearly 50 per cent.

This is the first show that will be conducted directly under the management of the American Foundrymen's Association. Upon presentation of their 1916-17 membership cards, those affiliated with the American Foundrymen's Association will be admitted free to the exhibition throughout the week.

The Tax on Munitions and Their Materials

Evasion of the 5 Per Cent Proposed on
the Latter Would Not Be Difficult—From
This Source \$10,000,000 Is Reckoned

WASHINGTON, D. C., Aug. 22, 1916—The Omnibus revenue bill, which was reported to the Senate on Aug. 16 after nearly a month's consideration by the Finance Committee, has been made the unfinished business of the Senate and will probably pass that body within a week or ten days. The leaders, therefore, hope to bring about an adjournment of Congress in the first week in September.

NO PROVISION AGAINST EVASIONS

The chief feature of the bill of interest to readers of THE IRON AGE is the provision for a tax on the manufacture of war munitions, which the Finance Committee has completely rewritten, abandoning the copper tax incorporated by the House and providing a flat charge of 10 per cent of the profits of munition manufacturers and 5 per cent of the profits arising from the production of materials used in the manufacture of munitions. For reasons wholly inexplicable, but not through oversight, as the committee's report draws attention to the fact although it does not explain it, the bill provides that the tax on the profits of both munition manufacturers and the producers of raw materials therefor shall be levied only on "corporations, joint stock companies and associations" and not upon individuals. It is therefore apparent that wholesale evasions of the law may be accomplished through the interposition of jobbers or middlemen carrying on business as individuals or partnerships. Manufacturers of material intended to be used in the production of munitions may escape the 5 per cent tax by selling to jobbers and the latter, if their business is conducted as individuals or partnerships, will incur no tax liability when selling direct to munition manufacturers even if the latter are incorporated. It is the opinion of legislative experts that the tax on the profits of corporations manufacturing materials will prove almost a dead letter because of possible evasions and will produce only a fraction of the \$10,000,000 originally estimated to be derived from this source.

A provision exempting from tax profits resulting from the manufacture of munitions for the United States Government was inserted in the bill at one stage of its consideration by the Finance Committee, but this was afterward stricken out, members of the committee fearing that if the tax should be made to apply only to war material intended to be shipped abroad the courts might invalidate the entire munitions section on the ground that it imposed a tax on exports, which is expressly forbidden by the constitution.

Owing to the marked differences between the House and Senate munitions tax provisions, it is evident that this feature of the bill will finally be perfected in conference committee; hence it is quite probable that in its ultimate form the munitions tax feature may be wholly unlike that drafted by either the Ways and Means or the Finance Committee.

TEXT OF THE MUNITIONS TAX SECTIONS

Following is the text of those sections of the Finance Committee's bill imposing taxes on manufacturers of munitions and materials therefor:

SEC. 41. (1) That every corporation manufacturing (a) gunpowder and other explosives; (b) cartridges, loaded and unloaded, caps or primers; (c) projectiles, shells, or torpedoes of any kind, including shrapnel, loaded or unloaded, or fuses, or complete rounds of ammunition; (d) firearms of any kind and appendages, including small arms, cannon, machine guns, rifles and bayonets; (e) electric motor boats, submarine or submersible vessels or boats; (f) any part of any of the articles mentioned in (b), (c), (d), or (e); shall pay for each taxable year an excise tax of ten per centum upon its entire net profits actually received or accrued for

said year from the sale or disposition of such articles manufactured within the United States.

(2) And every corporation selling to or manufacturing for any corporation mentioned in paragraph (1) any material entering into and used as a component part in the manufacture of any of the articles enumerated in (a), (b), (c), (d), (e) or (f), shall pay for each taxable year an excise tax of 5 per centum upon its net profits actually received or accrued for said year from the sale or disposition of such material so entering into or used as a component part in the manufacture in the United States of the articles so enumerated as aforesaid.

(3) This section shall cease to be of effect at the end of one year after the termination of the present European war, which shall be evidenced by the proclamation of the President of the United States declaring said war to have ended.

SEC. 42. Every corporation manufacturing or selling in the United States any of the articles mentioned in section 201 shall, on or before March 1 of each year, make a return under oath to the collector of internal revenue of the district wherein the principal office or place of business in the United States is located, stating the amount of capital invested in such business and the amount of net profits from the sale and disposition of such articles during the preceding taxable year, the names and locations of the corporations, and the amounts, character, and values of the materials obtained from such corporation for use in manufacturing the articles mentioned in paragraph (1) of this section. Where the corporation has separate capital invested in the manufacture of such articles its return shall be made on the same form as that used for income tax returns, and its net profit for the year shall be the gains or the profits assessed and taxed by the income tax authorities:

Provided, that in case such corporation has undivided capital invested in the manufacture of the articles specified in section 201 and of other articles, the return herein provided for shall be in such form and shall set forth such particulars as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may require, and the tax herein provided for shall be imposed only on the net profits resulting from the manufacture and sale of the articles specified in section 201 and the profits shall be determined from the books and accounts of such corporation:

Provided, however, that if the amount invested in the manufacture of, and the net profits resulting from the sale or disposition of, the articles so specified can not be determined, the amount invested in the manufacture of these articles, and the net profit therefrom, shall be considered as in the same ratio to the total amount invested and the total net profits as the gross receipts from the sale and disposition of such articles bear to the total gross receipts from the sale and disposition of all articles manufactured.

SEC. 43. All such returns shall be transmitted forthwith by the collector to the Commissioner of Internal Revenue, who shall, as soon as practicable, assess the tax found due and notify the corporation making such return of the amount of tax for which such corporation is liable, and such corporation shall pay the tax to the collector on or before thirty days from the date of such notice.

SEC. 44. If the Secretary of the Treasury or the Commissioner of Internal Revenue shall have reason to be dissatisfied with the return as made, or if no return is made, the commissioner is authorized to make an investigation and to determine the amount invested in such business, and the amount of net profits, and may assess the proper tax accordingly. He shall notify the corporation making such return and shall proceed to collect the tax in the same manner as provided in this title, unless the corporation so notified shall file a written request for a hearing with the commissioner within thirty days after the date of such notice; and on such hearing the burden of establishing to the satisfaction of the commissioner that the amount invested and the amount of net profits as determined by the commissioner is incorrect shall devolve upon such corporation, and the decision of the Commissioner of Internal Revenue, if approved by the Secretary of the Treasury, shall be conclusive.

SEC. 45. The tax may be assessed on any corporation for the time being owning or carrying on the business, or on any person acting as agent for that corporation in carrying on the business, or where a business has ceased, on the

corporation which owned or carried on the business, or acted as agent in carrying on the business immediately before the time at which the business ceased.

Sec. 46. For the purpose of carrying out the provisions of this title the Commissioner of Internal Revenue is authorized, personally or by his agent, to examine the books, accounts and records of any corporation subject to this tax.

Sec. 47. For the expense connected with the assessment and collection of the taxes provided by this act there is hereby appropriated \$100,000, or so much thereof as may be required, out of any money in the treasury not otherwise appropriated, and the Commissioner of Internal Revenue is authorized to appoint and fix the compensation of such officers, clerks, messengers, janitors, and other necessary employees in the enforcement of the provisions of this act for duty in the District of Columbia, or in any collection district of the United States, or any of the territories thereof.

Sec. 48. No person employed by the United States shall communicate, or allow to be communicated to any person not legally entitled thereto, any information obtained under the provisions of this title, or allow any such person to inspect or have access to any return furnished under the provisions of this title.

Sec. 49. Whoever violates any of the provisions of this title or the regulations made thereunder, or who fails or refuses to make the return required, or who knowingly makes false statement in any return, or refuses to give such information as may be called for, is guilty of a misdemeanor, and upon conviction shall, in addition to paying any tax to which he is liable, be fined not more than \$10,000, or imprisoned not exceeding one year, or both in the discretion of the court.

Sec. 50. All administrative, special, and general provisions of law, including the laws in relation to the assessment and collection of taxes not specifically repealed, are hereby made to apply to this title so far as applicable and not inconsistent with its provisions.

Sec. 51. The Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall make all necessary regulations for carrying out the provisions of this title, and may require any corporation subject to such provisions to furnish him with further information whenever in his judgment the same is necessary to collect the tax provided for herein.

The munitions tax is estimated by the Finance Committee to produce \$40,000,000 per annum. W. L. C.

Heat Losses Through Galvanized Roofing

Loss of heat through a roof of galvanized steel sheets is less than that through roofing consisting of cement and fibrous material compressed to sheets about 1/4 in. in thickness, according to experiments made last year by the National Physical Laboratory at Teddington, England. A model hut was built up of walls of cork slabs, 2 in. thick, and a roof of the new material or of galvanized sheet iron. The air inside was heated by electrical resistance which was not allowed to get

DIESEL-STEAM PLANTS*

Extending Steam Plants with Oil Engines— Lower Costs and Higher Efficiency

BY GEOFFREY PORTER

The Diesel engine is capable of effecting great economies in the operation of power stations that are close to their maximum capacity. The expense of extending the existing steam plant can be materially reduced if the Diesel engine is adopted instead of putting down additional boilers and steam generating equipment. It has also been found more economical in many cases to operate the Diesel engines in the enlarged plant to carry the regular load, reserving to the steam plant the peak and extraordinary loads.

The statistics of three combined steam and oil engine plants are offered for consideration. The first, A, is a small one on the south coast of England, B is in London, while C is a riverside station in the provinces. A and C are condensing plants while B is non-condensing. The capacity installed in both steam and Diesel engines in the last completed financial year in all stations is shown in the accompanying table, as is also the capital expenditure required for both types of prime mover.

The most noticeable feature of this table is the low capital expenditure for the Diesel engine plants compared with that for the steam plants, and also the great increase in the over-all efficiency of the combined plants as compared with that of the steam plant alone. The capital expenditure for the steam plant includes engines, dynamos, foundations, condensing plant and piping in the engine rooms, and boilers and settings, feed pumps, injectors and piping, chimneys, economizer and flues in the boiler house. The capital figures for the Diesel engine plant include the engines and dynamos, foundations and accessories.

The relative efficiencies of the stations, and the reduction obtained in the cost of generating power by the use of Diesel engines, depend of course, upon the proportion of the power that is generated by the Diesel engines. Station B, whose steam plant was five times the size of the Diesel plant was obviously unable to make as great a reduction in cost as was station A where the ratio of steam to oil was roughly as 1 to 1.

In selecting a Diesel engine certain general principles may be observed as a guide. The writer personally prefers that engine that has (1) a low piston speed, (2) a low mean effective pressure from the full load card, and (3) a low piston and crank pin loading. The general design of the crank shaft and its bearings, the gudgeon pin and the general lubricating arrange-

Statistics of Combined Steam and Diesel Engine Plants

Station	Steam Capacity, kw.	Capital Expenditure per kw., Steam	Over-all Thermal Efficiency, Per Cent	Diesel Capacity, kw.	Capital Expenditure per kw., Diesel	Kw.-hr. Generated in Last Completed Financial Year		Over-all Thermal Efficiency of Combined Plant, Per Cent	Reduction in Cost of Fuel with Combined Plant, Cents per kw.-hr.
						Steam Plant	Diesel Plant		
A.....	538	\$141.00	4.93	510	\$88.00	11,312	591,584	22.6	0.756
B.....	3500	135.80	6.1	600	129.50	2,133,214	2,429,214	10.5	0.992
C.....	860	193.00	2.6	540	90.80	403,431	1,127,557	6.5	0.552

sufficiently hot to set up appreciable radiation, and the air was agitated by a fan. The air temperature inside and outside differed by 30 deg. F. Contrary to expectation, the heat loss through the cement, measured per square feet, was 20 per cent greater than through metal, the reason being that the emissivity loss from the surface, and not the thermal conductivity of the material, is the decisive factor.

When the iron was painted black the heat transmission increased, becoming equal to that of the cement; when the cement slabs were painted with aluminum they behaved like the iron; the gradient in the material was only 2.5 deg. F.

The Driggs-Seabury Ordnance Company, Sharon, Pa., has completed an addition to its No. 2 boilerhouse and will finish, in a few days, the work of adding the second story to its pattern shop.

ments throughout must also be examined. By preparing a schedule of the various engines on which bids are received, in which are tabulated for each engine the number of cylinders, the brake horsepower per cylinder, the revolutions per minute, the cylinder diameter and stroke, the piston speed, and the ratio of stroke to bore a "speeded up" engine may be discovered.

G. W. Thompson, chief chemist of the National Lead Company, has issued a pamphlet entitled "Why Highly Oxidized Red Lead Is Superior." This pamphlet discusses the use of red lead in the preparation of paints for the preservation of iron and steel. Results of tests are given, in which the protective value of composite paints applied to iron and steel was determined, showing results in favor of those containing red lead.

*Abstract of a paper read at the meeting of the Diesel Engine Users' Association, Great Britain, June 23.

ESTABLISHED 1855

THE IRON AGE

EDITORS:

GEO. W. COPE

A. I. FINDLEY

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.*

Charles G. Phillips, *Vice-Pres.*

Fritz J. Frank, *Secretary*

M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: Guardian Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, \$5.00 per year; single copy, 20 cents; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

The President and the Labor Question

Woodrow Wilson has seriously injured the standing of the President of the United States with regard to disputes between employers and employees. The railroad controversy now pending—perhaps the greatest crisis in labor troubles ever known in this country—has very properly been taken before the chief executive in the hope that the parties to the disagreement may be brought together. All other efforts to effect a settlement of the trouble have failed—not because the railroad managers have not been willing to meet the men before some tribunal qualified to arbitrate their differences, but because the labor leaders have autocratically refused to submit their case for such an adjustment. Mediation, conciliation, arbitration—all have been rejected. None of the means provided by our laws has proved adequate to meet the situation, and the President, as a last resort, summoned the representatives of both sides to Washington, that he might make a personal appeal to them.

When the possibility of the matter being taken to the President loomed up a few weeks ago, it was regarded on all sides as an excellent thing to be done. It was then supposed that, by virtue of his high office, and the respect paid to the chief executive of the nation, attention would be given by both parties to the President's suggestions, and that a way out of the difficulty would be found. The President, however, has failed to maintain an impartial position in this critical emergency. He has made himself an advocate of one of the most disputed points in the labor program of recent years in announcing his belief in the general approval of the eight-hour work day and endeavoring to compel the railroads to concede this to their employees, arbitrating less important matters. His efforts have since then been so directed as to make it appear that the railroads were placing themselves in an attitude of defiance of his attempts to secure a peaceful outcome to the controversy.

By Mr. Wilson's pronouncement in support of the eight-hour workday he has undoubtedly endeared himself to the hearts of the labor leaders, but he has arrayed himself in opposition to a vastly more important section of the country, namely, the great body of all classes of employers and consumers. It is foreseen by them that if the railroads of the country should adopt an eight-hour day, either voluntarily or through stress of circumstances, it

would be exceedingly difficult to resist the demand which would then rise all over the country from all classes of wage earners for a similar shortening of working hours. This would further greatly increase the cost of living. It would so increase our manufacturing costs that it would be more difficult than ever for us to maintain our footing in the export trade. This country, by paying higher wages, has long had a higher standard of living than foreign countries, which has been a considerable handicap in building up our exports. To shorten the working day in all factories would make still greater the inequality between working conditions here and abroad. To use Mr. Wilson's own language in speaking to the railroad managers on Monday, such a contingency should by all means be avoided, as the time is coming when "every ounce of American energy has to be mobilized to meet the extraordinary situation which will emerge out of the European war."

Eight-Hour Day "Sanction"

Between 1,000,000 and 1,500,000 wage earners of the 30,000,000 engaged in gainful occupations in the United States work eight hours a day, according to John B. Andrews, secretary of the American Association for Labor Legislation, New York City. He says that about 10 per cent of the wage earners are organized and of these about 2,500,000 are identified with the American Federation of Labor. His estimates are based upon information from various sources. None of these placed the number of persons working eight hours a day at more than half of the total membership of the labor organizations and most of them considered it less than half. Yet President Wilson in his statement to the nation on the railroad crisis says that "the eight-hour day now, undoubtedly, has the sanction of the judgment of society in its favor." Whence the "sanction," and where has any pronouncement been made of the judgment of society"? On the contrary, the eight-hour day is the exception. For the United States to go to an eight-hour basis, with its competitors in the international race working from 25 to 50 per cent more hours and paying from 50 to 75 per cent less wages would be comparable in folly with the dead and buried proposal of 1896 to establish the 16 to 1 ratio between gold and silver "without the consent of any other nation."

Anti-Efficiency Fight Still to Come

Congress has put props under an anti-efficiency structure in industry. It will now doubtless attempt to make the underpinning permanent. The riders forbidding the use of some of the machinery of advanced industrial management are on appropriation bills having force for one year. Too much opposition evidently was feared to try for like measures of permanent application, such as the dormant Tavenner bill. The spotlight was too certain, in considering the specific act, to show up weaknesses in the argument supplied by the short-sighted union labor champions in the galleries. Passing over the belief widely held that the action of Congress represents the Administration's desire, the belief is strong that the Tavenner and similar bills will be brought up on the adjourned sessions of the present Congress, say in December. Thus a fight over a fresh and greater crime against industry is again threatening.

The individual Congressman's stand after election may show a reversal, but a change of front on such a well-discussed subject leaves too much to explain. Thus the immediate step for the employer in his everlasting vigilance campaign is to consult his candidates for Congress in the present campaign. If the latter has swallowed the bait of the labor lobby he needs enlightenment; if he has been numbered among the minority, he needs help to avoid defeat at the polls, for it is said of one valiant exponent of efficiency that organized labor has determined on his downfall and has sent emissaries to his district. It is no time for any resting on the oars.

A British View of American Exports

The London *Engineer*, which has long cultivated a philistine attitude toward American industry and commerce, has expressed the view, fathered by the wish, that American export trade will not be important after the war. The writer of the article is probably the same who at intervals since the Steel Corporation was formed has gravely told his readers that the corporation had such high costs and heavy fixed charges that it could never compete with Great Britain in foreign markets and would probably be beaten at home by the independent steel companies which hadn't so many bonds and hadn't run their necks into any such noose as the Hill ore deal.

After assuring British manufacturers that the activity of Americans in South America and in Australia and South Africa need not cause apprehension "so long as the former [Americans] continue the business policy which has been their special characteristic for many years past," the *Engineer* finds one indication that may prove important:

American firms are beginning to inquire more in foreign markets as to the actual requirements of these markets with a view to the production of goods which will actually meet their needs. We cannot say how far this movement has extended, but it is certainly developing.

That is interesting; indeed, from an American standpoint it might even look promising. But still there is no cause for alarm; as witness:

This expansion in adaptability, however, will not overcome the most formidable difficulty of all, namely,

the question of credit, and so long as the Americans insist on cash payments in New York against the shipping documents or the definite availability of foreign credit in New York at the end of one month, so long will they be hampered in the promotion of the export trade on the scale which is hoped for from the accumulation of wealth arising solely from the existing artificial situation.

This should be final, even though the writer be innocent of the propaganda that has gone on since the war began, for the use of acceptances in American trade abroad, and in spite of the full appreciation here of the part it must play in the extension of the country's foreign trade. But this good friend of American industry, to make complete the demolition of any air castles that may now be building upon our war prosperity, finally assumes that our manufacturers extend credit to foreign buyers and give them the goods they want. Still all is vain; for

unless the Americans are able to manufacture more cheaply than other countries and actually sell more cheaply, even the incipient adaptability and possible extension of the credit system will not give them the great hold which they hope to obtain in external markets as a result of the present international situation. Except under extraordinary circumstances and conditions the Americans have not beaten us in the past, nor will they do so in the future unless they are prepared to sacrifice a considerable amount of their profits arising directly or indirectly through the war; but as a general rule wealthy companies in the United States trade for the purpose, not of throwing money away, but of earning it, and there is nothing to show so far that any change in this direction may be expected.

That is to say, British companies owe their success in foreign markets to their passion for "throwing money away," and when Americans can be cured of the habit of looking on trade as something out of which to make money, they may be considered fairly on the way to the capture of world markets.

There is one sage remark in all these sententious and semi-sententious utterances, but it has been made many a time in practically the same terms by our own manufacturers, and that is that this country must rely for the extension of its trade abroad on being "able to manufacture more cheaply than other countries and actually sell more cheaply." Two classes of citizens appear to think these economic facts can be dodged; they are the labor unions and the men in public life who put hobbles on industry and label them the "new freedom."

Connellsville and By-Product Coke

The by-product coke ovens are not sounding the death knell of the Connellsville coke industry so rapidly. In the past few weeks the Connellsville operators have had great difficulty in maintaining shipments at the rate required by their contracts, and coke for prompt shipment has been at a premium as compared with contract prices. Last September it was the market appraisal that in the second half of this year Connellsville coke would be very plentiful through many by-product ovens having been completed, that appraisal being shown in the fact that coke contracts for the year were made at lower prices than

contracts for the first half of the year, coke being regarded as less valuable for the second half.

It is pertinent to note that the check to Connellsville coke production, when it does come, cannot be regarded as sudden, for the Connellsville region has been losing ground, relatively, for years. An interesting comparison can be made. In 1906 the output of the Connellsville and lower Connellsville region was reported at about 20,000,000 net tons. The production of pig iron in that year was 25,300,000 tons. In general terms, the production of pig iron at this time may be taken at about 39,500,000 tons, there being a lower rate during the hot weather, but without corresponding decrease in the coke consumption. By the rule of three, based on the statistics of 1906, Connellsville should now be producing 600,000 tons of coke a week instead of the 400,000 tons a week reported lately by the *Connellsville Courier*. By that amount the Connellsville coke industry has lost ground in the past ten years, relative to the industry of the country. The actual production per week, however, is practically the same as in 1906. Any check that may come, therefore, cannot be regarded as so very sudden.

The scarcity of labor is dampening the effect of the by-product coke oven projects upon the Connellsville coke industry. This labor scarcity has both delayed the completion of the by-product ovens and has restricted the output of Connellsville coke, which appears to be at a rate 10 to 15 per cent less than could be accomplished were there a full supply of men willing to do a full week's work every week.

A further softening of the effect of the new by-product coking capacity occurs through the relatively high prices now obtainable for coal, whereby the Lower Connellsville coke operators see before them a market for raw coal which may be more profitable, per ton of coal mined, than has been a considerable portion of the coke sold in the past. Thus, altogether the shock to the Connellsville coking industry by the spectacular rush to build by-product coke ovens is not proving so great as was expected.

The Tungsten Market Falling

The tungsten market has taken a decided drop in the past week until ferrotungsten can be obtained as low as \$2.75 per lb. of contained tungsten. A short time ago it was as high as \$4.50, with the top price at \$8 to \$10 at the peak of the movement. Tungsten concentrates, 60 per cent WO₃, are also lower, some fair-sized sales having been made at \$17 to \$19 per unit of tungstic oxide. The foreign demand from both France and Russia is reported strong, with sales of 100 to 200 tons at the above figure. England is also said to have bought 80 tons of concentrates in the past week. The foreign demand for ferrotungsten is also more active than for some time. Domestic buying is expected to increase.

A wireless message from Berlin to Sayville, N. Y., dated Aug. 17, says that the Roumanian State Railroads have contracted with the German Steel Works Union for 25,000 to 30,000 tons of rails. On the same date it was announced by wireless from Berlin that the pig-iron production in Germany in July was 1,134,000 metric tons, against 1,047,000 tons in July, 1915, and 1,561,000 tons in July, 1914.

Thomas Iron Company's Report

The Thomas Iron Company, Easton, Pa., has issued its sixty-second annual report, which covers operations for the fiscal year ended June 30, 1916. This report is signed by the retiring president, Ralph H. Sweetser.

The income statement for the year shows a net profit of \$72,512.99. This profit, however, was brought about by the company's income from investments, amounting to \$171,885.08, as a net loss was realized on pig-iron sales of \$99,116.43, and on ore sales of \$255.66. The investment income was derived mainly from dividends by railroad companies in which the Thomas Iron Company is interested. The net profit the previous year was \$37,901.97.

The total revenue from pig-iron sales was \$2,428,777.32, while the expense of operating furnaces was \$2,527,893.75. The balance sheet shows a surplus at the close of the year of \$1,515,634.51.

From the accompanying remarks by the retiring president the following extracts are taken:

"The fiscal year just ended has seen some remarkable changes in the iron business, and especially in the costs and prices of iron, raw materials, supplies and labor. During July, 1915, our company was operating two blast furnaces and Richard mine, and shipped 7565 tons of pig iron; during a part of the month of June, 1916, we were operating five blast furnaces, and we shipped 17,884 tons of pig iron. The great advances in the market prices for pig iron during the year have been almost equaled by the increase in the cost of production. Wages were advanced three times, with a total increase in the rates amounting to 27 per cent. During the same time the cost of raw materials and supplies increased even more than wages.

"The average number of furnaces in blast during the year ended June 30, 1916, was 3½ out of a total of 7. The number of furnaces owned by the company was reduced from 8 to 7 by the dismantling of No. 6 at Hokendauqua. The quantity of pig iron produced was 152,737 tons, an increase of 100,081 tons over the previous fiscal year. The stock of pig iron on hand was reduced from 10,010 tons on July 1, 1915, to 5360 tons on June 30, 1916. Richard mine has produced 49,673 tons of ore this past year, all of which was shipped to our own blast furnaces. This makes a grand total of 3,204,028 tons shipped from this mine.

"The great increase in the export business of our country this past year, and more especially in munitions of war, has added much to the prosperity of industrial corporations and railroads, but the prosperity has not been evenly divided. Many troublesome features incident to the increase in traffic beyond the capacity of the railroads and vessels have put hardships and increased costs on many industries, which have not benefited by correspondingly high prices for their own products. The greatest drawback was the inflation of the labor market, bringing about scales of wages abnormally high, and a scarcity of mechanics, semi-skilled labor and common labor. This was especially burdensome on the manufacturers of pig iron, because the price of pig iron did not keep up with the great increase in the price of finished materials.

"All these rapid fluctuations in market prices show conclusively that a merchant pig-iron company should either have some outlet for its iron through finished products, or else should control extensively its own sources of raw materials. The Thomas Iron Company has no mills for the consumption of its own pig iron, but it does have iron-ore mines. Unfortunately, these mines are not far enough advanced in equipment and development to furnish a large enough percentage of the ore required to greatly reduce the cost of making pig iron. It is absolutely necessary that the company should spend enough money at its Richard mine to put the mine in condition for producing ore at a lower cost than is now possible. On account of the lack of working capital, the work on the new shaft is already ten months behind. I strongly advise that the new shaft be completed at the earliest possible moment.

"Although we have gained at our blast furnaces by the installation of improvements from time to time, we cannot expect to reap large enough benefits unless

we expend considerable money. There is no question as to the plan of centralizing at the Hokendauqua plant. No. 3 furnace is much better equipped than ever before, but is not yet complete. No. 1 furnace needs to be rebuilt so as to put it in condition to economically make pig iron. The strategic location of the Hokendauqua plant in regard to railroad facilities is a very strong feature in favor of the continuance of the iron business of our company.

"The \$400,000 of bonds authorized by the stockholders March 10, 1916, can be used only for improvements, and are not available for the present urgent need of more working capital. Of this additional issue, \$34,000 of bonds have been certified.

"The option on all the property of the Thomas Iron Company granted to Nils L. C. Kachelmacher last October expired Feb. 11, 1916, without being exercised.

"Because of the urgent need of working capital, your board of directors deemed it inadvisable to declare a dividend at this time."

The Orient as a Market for American Railroad Equipment

WASHINGTON, D. C., Aug. 22, 1916.—The Department of Commerce announces the appointment of a special agent to undertake an investigation of the field for American railroad equipment and supplies in the markets of the Far East, Australia and South Africa. Frank Rhea, of the Division of Valuations of the Interstate Commerce Commission, has been appointed special agent to make the investigation and is already engaged in making arrangements, which will be held during a preliminary trip to the principal manufacturing centers in this country. This preliminary trip will be made in September.

When the special agent has learned what information the manufacturers in this country want concerning railroad conditions across the Pacific, he will go abroad and make a careful study on the ground of the conditions as they affect railroad construction, equipment, traffic, the probable extension or reconstruction of railroads, tramways, etc. While all specific opportunities for securing orders will be promptly reported, the real purpose of the investigation is to gather together the fundamental facts and conditions that will enable the American manufacturer to consider intelligently the different fields and to determine whether it is to his advantage to enter any of them.

Manufacturers and others who wish to get in touch with Mr. Rhea before he leaves this country should address the Division of Commercial Agents, Bureau of Foreign and Domestic Commerce, Custom House, New York. This is the new office opened in New York by the bureau to keep in closer touch with business houses interested in foreign trade.

W. L. C.

The National Industrial Traffic League, whose headquarters are in the Tacoma Building, Chicago, has issued a circular announcing the failure of negotiations between its committee on car demurrage and storage and a committee of the American Railway Association in respect to demurrage rates. The League has notified the Interstate Commerce Commission that the agreement between the carriers and shippers, as represented by the League, has been broken by the carriers, and it appeals for a thorough investigation of the question of car demurrage in case the carriers should file the increased tariffs contemplated by them.

The growth of manufacturing interests at Los Angeles, Cal., is impressively set forth in a bulletin issued in July by the Los Angeles Chamber of Commerce. This bulletin gives illustrations of 11 important factories built in the first six months of this year. The total number of new factories and plants started or projected in this period was 37, involving an expenditure of over \$12,000,000 for machinery and equipment. The American Can Company has just completed a plant for the manufacture of cans involving a total expenditure for land, buildings and machinery of \$500,000.

STEEL COST TO IMPLEMENT MEN

Manufacturers' Committee Finds "Supply and Demand" Making the Market

As has been well known, the National Implement and Vehicle Association has had at work for some time a special committee on materials. Its particular duty has been an investigation of the situation in finished steel, particularly as affecting prices implement makers will have to pay for steel bars for 1917. The report of the committee has just been sent out to the membership. In the accompanying letter E. W. McCullough, secretary and general manager of the association, says that "steel has advanced 125 per cent base since purchases were made which enter into implements sold to the trade this spring." He adds that further advances in prices of implements will be necessary to cover the higher prices of materials and labor. The report of the committee on materials is as follows:

"Your special committee charged with the investigation of the material situation held their last meeting on the 3d inst., to consider the results of three conferences with representative steel interests, during which our condition, both as to the present and the outlook of the future, was most carefully placed before them. Our conclusions, reluctantly arrived at, are briefly as follows:

"1. The market is being regulated by 'supply and demand.' The extraordinarily large demands for steel from every branch of domestic trade and from all parts of the world naturally have resulted in advanced prices and a stiff market.

"2. Because of the unusual world-wide conditions, there is nothing reliable on which to base any expectation of early relief in steel prices, and each manufacturer should choose his own course as to contracting at the present market.

"3. Because of expectations up to this time of some relief as to materials, present prices of implements and other farm equipment reflect only a partial recognition of the increased and increasing cost of production.

"4. That in view of the reasonable certainty of having to pay present prices for steel and other materials, ordinary prudence suggests that manufacturers figure their costs of production anew on the current market prices for material, labor and all other items entering into their present manufacturing costs, and base their selling prices upon these new costs.

"5. That we must frankly report our inability to secure special consideration for our industry in the way of concessions in the price of material, due to the unparalleled and world-wide demands of other consumers who are willing to pay current market prices.

"6. That this situation, over which it is evident we have no control, should be frankly placed before your dealers, and by them, in turn, before their customers—the farmers; and it is suggested that those dealing both with trade and farm papers should acquaint them with these facts, namely, that farm equipment is worth more because it costs more to produce.

"7. That the necessity for these advances should be presented without apology, for the earning power of up-to-date farm equipment will fully justify purchases as freely as in the past, and the increased price of farm products which has come through the same causes is naturally offsetting much or all of this increased cost. Your sales force should not overlook these facts. More and more liberal purchases and use of farm equipment is justified in these times than in any previous era of farming.

"Your committee found in a careful canvass of representative manufacturers among our membership who answered our secretary's inquiry on this point that only three out of 82 had contracted steel for 1917, and those for a quantity not exceeding 5000 tons—all reports to the contrary notwithstanding; yet as to what should now be done, each must weigh the facts and judge for himself.

"If due regard is given to actual conditions existing and to your own best interest, and also to the effect your actions will have in the direction of cheerfully

and constructively promoting business conditions in your lines, we think that matters will in their natural course work out satisfactorily for all concerned. It is a time for prudent, deliberate and courageous action."

American Commission to France Sails Saturday

The American Industrial Commission to visit France on the basis of unsolicited proposals made to the American Manufacturers' Export Association sails for that country on Saturday, Aug. 26, on the steamship Lafayette. As noted in THE IRON AGE of July 20, the object of the commission is to make a technical investigation of present conditions in France looking to the reconstruction and reorganization of her communities and industries now and after the war. It is to determine also how the United States may contribute, as in largely increased purchases of French products. The French government is to aid the commission, partly through providing for transportation, and the itinerary, which includes some 25 cities, was given in the earlier article. In the composition of the commission the effort has been to secure men of broad experience in some nine general classifications of industry and at the same time of a caliber calculated to lend dignity and standing to the enterprise. A printed report of the results of the commission's visit is promised.

W. W. Nichols, assistant chairman Allis-Chalmers Mfg. Company, Inc., heads the commission as chairman. J. G. Butler, Jr., vice-president Brier Hill Steel Company, Youngstown, Ohio, and director of the Commercial National Bank, Youngstown, is scheduled to represent the iron and steel industry. Ambrose Swasey, Warner & Swasey Company, Cleveland, is also numbered in the party. Among others of the commission, some fifteen in all, are the following: A. B. Farquhar, president A. B. Farquhar Company, Ltd., York, Pa.; James E. Sague, former vice-president American Locomotive Company and Public Service Commissioner, New York; F. J. LeMaistre, consultant, E. I. du Pont de Nemours & Co., Wilmington, Del.; John R. MacArthur, MacArthur Brothers Company, New York; Dr. C. O. Mailloux, consulting engineer, New York; E. A. Warren, vice-president Universal Winding Company, Boston; Samuel W. Fairchild, vice-president Fairchild Brothers & Foster, chemists, 76 Lighthouse Street, New York; Noble Foster Hoggson, president Hoggson Brothers, Inc., contractors, New York; E. E. Russell, J. I. Case Threshing Machine Company, Racine, Wis., and George Burdett Ford, Geo. B. Post & Sons, architects, New York. E. V. Douglass, secretary American Manufacturers' Export Association, 160 Broadway, New York, and secretary of the commission, arrived in France this week.

Central Iron & Steel Company's Report

Receivers of the Central Iron & Steel Company, Harrisburg, Pa., have filed their report of the operations of the plant from March 1, 1915, to Feb. 29, 1916. The report shows that the year's operations resulted in an increase in the net assets of \$202,750.97, after allowances for interest, receivers' expense and taxes. The gain was brought about, the report declares, by the earnings of the last three months of the period covered.

The open-hearth department produced 86,985 gross tons of ingots, comparing with 55,446 tons in 1914 and 88,948 tons in 1913. The rolling mills produced 91,398 net tons of plates, which compares with 62,055 tons in 1914 and 89,109 tons in 1913. The rate of operation was 59 per cent of capacity as compared with 40 per cent in 1914. The blast furnaces were not in operation.

The total sales during the year amounted to \$2,940,378.13 compared with \$1,899,426.06 in the preceding period.

Among the plant improvements were a new and modern ladle crane of 150 tons capacity in the open-hearth department, and two waste heat boilers, together with boiler house building, at No. 1 mill. Other improvements are being planned to increase the ingot production.

COMBINES FOR FOREIGN TRADE

An Effort to Pass the Webb Bill at This Session of Congress

WASHINGTON, D. C., Aug. 22, 1916.—Chairman Webb of the House Judiciary Committee has filed in the House a favorable report upon the bill drafted by the Federal Trade Commission and designed to exempt from the operation of the Sherman anti-trust law and acts amendatory thereof, combinations of American manufacturers and merchants engaged solely in the export trade. A strong effort will be made to pass this measure in the House before adjournment, and should the present session be protracted a similar attempt will be made in the Senate, the enactment of the bill at this time depending largely upon the legislative exigencies of the closing days of an extraordinary session.

In urging the passage of this important measure the committee expresses the opinion that it will be "much needed to meet trade conditions which are likely to follow a declaration of peace among the great commercial nations of Europe now at war," and adds that it "earnestly recommends its enactment at an early date in order that our exporters may fortify themselves in time to meet the expected competition." The report describes the methods employed by British syndicates, German cartels and French *comptoirs*, and the fact is emphasized that these combinations receive governmental recognition. A significant illustration of the effectiveness of combinations is given in the case of a large electrical contract in Chile two years ago, where a German combination, during a period of three or four years, spent no less than \$60,000 in drawing plans and specifications for submission to the Chilean government in competition with three American concerns, all of which spent large sums of money on three different sets of plans. The cost to the American firms, the report points out, was approximately three times the amount they would have had to spend if the pending bill were enacted into law.

An important chapter of Mr. Webb's report deals with the legal aspect of the measure as it modifies existing statutes. In this connection he says:

The bill is drawn so as to leave in full force our anti-trust laws as applied to our own markets and as affecting different American exporters in their dealings with each other. Export trade is, by force of the methods adopted by other leading nations, largely a matter of competition between nations. Our home market is to be determined by competition between the several producers and manufacturers.

In order to safeguard the home market it is provided in the bill that the associations authorized by the bill must be for the "sole purpose of engaging in export trade and actually engaged solely in such trade, or an agreement made or act done in the course of export trade by such association, provided such association, agreement or act is not in restraint of trade within the United States."

Permission is granted to own the whole or any part of the stock of a corporation organized solely for the purpose of engaging in export trade, etc., under the terms of the Clayton Act, only when such acquisition does not have the effect of restraining trade or substantially lessening competition within the United States in articles of the kind exported by the association whose stock is acquired or controlled. And, further, by section 5 it is required repeatedly to inform the Government of the manner in which it is availing itself of the privileges granted by the bill.

Many great lawyers, Mr. Webb says, think there is nothing in existing laws to prevent American manufacturers and exporters from combining in whatever manner they please in foreign countries to dispose of their products; but other lawyers take the position that there is doubt about this power, and, in order absolutely to clarify the situation and in common fairness to all American exporters, many of whom are not in a position to maintain costly law departments, the committee presents this bill, which "prohibits the slightest violation of our anti-trust laws within the United States, but makes it clear that American exporters doing business in foreign countries are to be allowed to proceed in accordance with foreign laws." Few, if any, foreign countries, Mr. Webb says, compel their exporters to ob-

serve business standards prescribed by our anti-trust laws; hence there would seem to be no reason for requiring our exporters to observe a higher and stricter standard of conduct than their foreign competitors are required to observe.

W. L. C.

BRITISH STEEL EXPORTS

June Shipments Large Despite Restrictions—A Record in Export Values

British iron and steel exports in June, excluding iron ore and including scrap, were 310,595 gross tons comparing with 395,750 tons in May, the record month for the war, making the average for the first half of 1916 313,864 tons per month. The 1915 average was 270,858 tons. The bulk is made up of exports to Great Britain's war allies.

June pig-iron exports were 66,150 tons against 83,839 tons in May. To July 1, total pig-iron exports were 439,703, tons against 126,521 tons to July 1, 1915. Of the former total France took 267,893 tons and Italy 81,940 tons. Ferromanganese exports in the first half were 67,000 tons; to July 1, 1915, they were 40,000 tons.

Steel-bar exports to July 1, were 361,366 tons (of which 308,755 tons went to France), against 228,552 tons to July 1, 1915.

Rail exports in June were only 3243 tons as against 23,728 tons in June, 1915. To July 1, this year, they were 28,278 tons comparing with 123,966 tons to July 1, 1915. The shipments of galvanized sheets continue at about 50 per cent of the movement a year ago. In June they were 10,861 tons against 25,091 tons in June, 1915. To July 1, 1916, they were 84,834 tons against 167,415 tons in the same period in 1915. Tin-plate exports are about stationary at 30,351 tons in June, against 33,986 tons in June, 1915. The total to July 1, was 188,598 tons against 198,335 tons to July 1, 1915.

June iron and steel imports, excluding iron ore and including scrap, were 86,303 tons, which compares with 89,089 tons in May, the record month this year. Imports of blooms, billets and slabs were only 11,223 tons in June comparing with 64,882 tons in June, 1915. For the half year to July 1, 1916, they were only 75,996 tons as against 207,289 tons to July 1, 1915. The United States furnished 59,097 tons of this year's total. Iron-ore imports were 645,559 tons in June against 687,742 tons in May. To July 1, they were 3,389,590 tons as against 3,063,515 tons to July 1, 1915.

An interesting fact in connection with the exports of iron and steel is that the value for the total to July 1, 1916, was close to £29,000,000 or at the rate of £58,000,000 per year. In 1913, the high water mark in value but not in tonnage was reached at £54,000,000. Present export values are therefore a record.

A British Contract for 200,000 Shell Forgings

The Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., has received an order from the British Government for 200,000 4.5-in. steel forgings for high-explosive shells. The contract calls for the completion of deliveries by Dec. 31, 1916. The forgings will be finished into shells in England.

J. E. Rhoads & Son, 12 North Third Street, Philadelphia, recently shipped one of the largest leather driving belts ever manufactured from their plant in Wilmington, Del. It was consigned to the Diamond State Fiber Company, West Conshohocken, Pa. The belt, endless and of water-proof construction, is 146½ ft. long and three-ply in thickness. It weighs about 1800 lb. and is worth approximately \$5,000.

The Elyria Iron & Steel Company, Elyria, Ohio, has placed a contract for the erection of an addition to its plant in Cleveland, but the cost will be less than \$75,000, as reported. The product of the company at its Cleveland plant is light gage oxy-acetylene welded tubing of high grade.

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BRITISH WORKSHOP NEEDS

Shortcomings for After-War Competition with America and Germany

A severe arraignment of the British industrial situation, particularly as regards the metal-working trades, all looking toward the changes which must be effected for after-war competition, was made in a late issue of *Engineering* of London by H. F. L. Orcutt, managing director of the Gear Grinding Company, Ltd., Hansworth, Birmingham, England. The following passages making comparisons between British and American, and British and German methods and practices will be of interest.

Germany and America's trade supremacy has not been built up by passing chambers-of-commerce resolutions and legislative protection, but by systematic, hard, slogging work. The two countries which England must meet as rivals in trade and industry are the United States and Germany.

Some special features of American industrial life should be first considered, for the reason that the most important progress made in Germany is due to the slavish copying of American manufacturing devices and methods.

In the United States the manufacturer is favored by two unique circumstances. He has the largest home market in the world. He can put his wares on the market practically with no regard to his customers' fads. This makes it easy for him to follow a policy of preparing for turning out goods in large quantities and of a standard pattern—two essentials to low costs combined with good quality. No better example can be found to illustrate than the American motor-car. Estimates for the near future are for an output of 1,000,000 per annum. An outside estimate for the total production of motor-cars in Great Britain is probably 25,000 annually. The American public take the car offered by the maker with standard body and fittings, rarely questioning even the color. The customer in England demands individual details and fads until manufacturing in the real sense is impossible. In the United States the maker leads the public; in England the public strangle the maker.

As to the home market, in which large quantities of goods are absorbed, this is a difficult situation to meet. It probably can be met, however, by co-operation with the Colonies and Dependencies of Great Britain. In respect to individual demands of customers there should be no difficulty. The British public take the standard American article without murmur.

AMERICAN SUPERIORITY

With but few exceptions, in every line of manufacturing in the United States the mechanical equipment is superior to that of Great Britain. To reform completely the equipment of British workshops is merely a matter of having the money to purchase plant. It is the profitable operation of good plant that is not generally understood in England and in which America leads. The production of standard articles in large quantities naturally calls for the best mechanical outfit.

The best mechanical outfit naturally demands the highest skill to work it efficiently. There are plenty of good workmen in England, but there is a lack of skilled men who understand the operation and management of automatic machinery and refined methods of production. Even in the United States conditions are not satisfactory in respect to the quantity of skilled mechanics, who cannot be trained in less than from three to five years.

THE MATTER OF SOCIAL STATUS IN WORKS

The superior productive capacity of the average American manufacturing establishment as compared with the English shop is largely due to the type of man mainly responsible for output. In the States this type is cultivated by the capitalist. In England he is usually a casual growth. In America his opportunities for advance are unrestricted. In England he is a fixture in his class as much as the working man or

the tradesman. It naturally follows that in the one case he is the social and technical equal of other officials, in the other he is of inferior rank, neither consulted nor considered in many matters directly relating to his responsibilities. In the one case his authority is unlimited in his department, in the other he is too often the subject of interference and restriction. Responsibility is in the one case wide, in the other narrow, high remunerations as compared with low salaries, social standing with no barriers as compared with boundaries distinctly difficult to break through. There is not much doubt as to which country offers the highest inducement to efficiency.

The American is willing to pay for training the men; the Englishman is not. The result is that in the United States we find apprentices paid high wages, in Great Britain little or nothing (often a premium is required). The American pays for technical training directly connected with workshop practice. The Englishman is shouting for State aid and technical school assistance paid for out of the rates.

The results in industry are well known. American labor is the most efficient and the highest paid. That is, any article which can be produced in quantities on specially arranged machinery can usually be turned out in the United States at a lower cost than in Great Britain. This would be impossible without the assistance of the highly trained worker.

GROWTH OF SCIENTIFIC MANAGEMENT

One of the most important developments in the United States affecting costs and output is what is known as scientific management. It is comparatively new and not generally adopted. It is a success beyond question. Its methods are really scientific and far reaching. It will be condemned at sight by trade unionism. Its relation to manufacturing is the same as that of chemistry to the production of dyes.

The leading principles of the experts in this science are well worth recording.

1. Changes in methods of manufacturing to be undertaken slowly, only as rapidly as they can be kept in hand, absorbed and operated by management, staff, and workers.

2. Increased output.

3. Increase in wages.

4. Lessened fatigue.

5. Selecting the task the individual is best suited to undertake.

The leaders in scientific management insist over and over again that the above is their aim. Their order of work is, first, a complete study of conditions; second, compiling, tabulating, and digesting facts; third, suggesting new methods; fourth, training staff and workers in improved methods. Scientific management already has a large literature. It is in full swing in a number of works. Its future is assured. It is only a matter of time when it must be universally adopted. Successful competition without it is difficult, in many cases impossible.

FREE INTERCHANGE OF INFORMATION

One peculiar characteristic of the American which contributes not a little to his all-round progress is worth mentioning, that is, the free interchange of opinions and information even among those producing the same article. They visit each other's factories, compare notes, write papers giving details of processes and methods with a freedom that certainly makes for progress. It cannot be said that the American attitude in this matter is dictated by patriotism or public interest. It is rather the natural accompaniment of rapid changes and freedom from conservatism. The opposite condition exists, generally speaking, in England, with obvious results; contentment with old methods and out-of-date plant being the rule instead of the exception.

GERMANY AND AMERICA COMPARED

Germany's manufacturing position which she holds to-day is the result of studying, absorbing and copying American machines and methods. Broadly speaking, her mechanical outfit is superior to that of Great

Britain, second only to the United States. During the last 25 years she has bought heavily of American machines. She has copied them, and now produces in her own machine-shops the counterpart of nearly every one which is worth having. In the proper equipment of her workshops alone England has a task before she can run parallel with Germany and be in a position to turn out manufactured articles to compete in price and quality. Unlike America, Germany has not the large home market. She has made, however, a large foreign market, which, combined with her home consumption, gives her the first requisite of cheap production—i.e., large quantities.

Broadly speaking, although the mechanical equipment of the German is pretty well on a level with the American, he lags somewhat, for the reason that the American is more original, bolder and more practical. The American always will lead. His methods of working are sounder. He is first of all practical. The men from whom improvements come have a training superior to the German. This training is acquired in actual working conditions. The Germans rely on, in fact, make a fetish of, book-learning. In his mechanical and scientific work the German is spoon-fed, as in all other things. He relies principally on some government official for guidance, control and assistance. Without doubt the pre-war admirers of German methods of training and education will not be so much in evidence in the future.

STATE TRADE SCHOOLS NOT THE BEST

State-controlled continuation and trade schools of Germany have little in them worth imitation compared with the systems of apprenticeship and manual training arranged and maintained by many American manufacturers out of their own pockets. Even the technical and scientific institutions of Germany are not the equal of similar organizations in the United States.

Comparison of the individual scientist in Germany and America is distinctly in favor of the latter. The American is broader, willing to take wisdom wherever it may be found and apply it wherever it pays. The German is restricted by government regulations and low wages. One merit is common to both countries—that is, the scientific expert is looked upon as indispensable to industrial progress and efficiency. The training of engineers and workmen in Germany, as in the United States, is undertaken thoroughly and systematically.

The introduction of improved methods of management are directly and openly opposed by the English trade unionist. Whether this is justifiable or not, competition on the part of British manufacturers in the world's market is impossible as long as it continues.

STATE AID TO GERMAN INDUSTRY

Rightly or wrongly, the backing which the banks have given to industrial enterprise in Germany has been a most important aid to her development. Practically speaking, extension of manufacturing has never languished for want of money, banks advancing for capital expenditure as well as working funds. In the extension of her foreign trade German merchants have been assisted by low inland freight rates charged on goods for export. The opposite extreme is found in Great Britain, where inland freight rates on all goods are the highest in the world. The lowest all-round rates are in the United States.

FORCED USE OF AUTOMATIC MACHINERY

We can take advantage of a condition forced upon us by the crisis with which we are now struggling—that is, the enormous amount of new machinery which we have been obliged to install for the production of war material. This country has never within such a short space of time bought and put into operation such vast quantities of up-to-date machinery. Manufacturers who have for years followed hand methods of production find themselves the possessors of automatic machinery which they never would have purchased. They have few men who understand the machinery which they are forced to operate and with which they must turn out articles which must pass inspection and

be made to gage. They are learning the lesson and getting paid for doing it.

The high wages being earned by both the skilled and unskilled worker really dominate the whole situation and may at once put obsolete or antiquated machinery out of commission. High wages combined with up-to-date plant (properly worked) usually means low production costs. This fact the English manufacturer has never fully grasped, although it has been established for years in the United States.

The present high wages will be a blessing to all. They will never go back to the pre-war standard. Exactly what the worker will be when this crisis is over depends on how long the crisis lasts. If it lasts long enough, he will have learned that it is not to his own interest to do as little in a given time as possible, that he will be better off when he has learned his trade thoroughly and encouraged and helped others to become skillful craftsmen; that to be subject to discipline is not a degradation or a hardship, but a duty and a necessity to which all must submit; that he will always be the subject of suspicion and distrust unless he adheres to his written or spoken word; and that the happiness of one man at the expense of another is not good citizenship.

British Electric Steel in 1915

Supplementary statistics of the British steel industry, recently made public by the Iron and Steel Allied Trades Federation, state that in addition to the 8,350,944 gross tons of steel ingots originally reported as the 1915 output, as given in THE IRON AGE, May 4, 1916, the following was also produced:

	Gross Tons
Electric steel ingots.....	20,000
Electric steel castings.....	2,000
Steel castings	177,071

This brings the total steel output to 8,550,015 tons, as compared with 7,835,113 tons in 1914, and 7,663,876 tons in 1913.

The production of ferroalloys in electric furnaces in 1915 is given as 1500 gross tons of ferrosilicon, 1250 tons of ferrotungsten, 2000 tons of ferrochrome, and 500 tons of other ferroalloys. The same report gives the following table of the number of electric furnaces actually operating and being built in Great Britain in 1915:

	Operating	Under Construction
Heroult	15	10
Electro-Metal (Grönwall-Dixon) ..	4	6
Stassano	2	0
Snyder	0	4
Rennerfelt	1	2
Stoble	1	0
Total	23	22

The review of the electric steel industry in THE IRON AGE, Jan. 6, 1916, credited England with 46 furnaces operating or under contract.

To Take Australia's Spelter

A London cablegram dated Aug. 17 states that an agreement has been reached between Great Britain and Australia under which Great Britain contracts to buy 100,000 tons of zinc concentrates and 45,000 tons of spelter annually from Australia during the period of the war and for ten years afterward.

The effect of the agreement will be to insure the transfer of the smelting industry from German to British hands. The amount involved in the agreement exceeds £25,000,000 (nearly \$125,000,000,) covering more than half of Australia's annual output. The rest of the output is expected to be taken over by France and Belgium.

Considerable additions to its New York Harbor equipment have just been ordered by the Lehigh Valley Railroad. Contracts have been let for a steel steam-lighter with a capacity of 582 tons; one 25-car capacity steel car float; two 12-car capacity steel car floats; 10 grain boats, each of 1000 tons capacity, and six 90-ft. covered barges for the transportation of general merchandise.

Iron and Steel Markets

LARGE SALES OF PIG IRON

Many Steel Works in the Market for Basic

Much More War Steel Wanted—Implement Makers Must Pay High Prices

Pig iron rather than steel has been the market leader of the week. The spectacular orders for shell and other war steel, with deliveries running six to ten months ahead, having been put on producers' books, interest in the steel trade centers on the balancing of supply and demand in the domestic market for the first half of 1917. Yet it is evident that the Allies want much more steel from the United States. Producers have been solicited again in the past week, in dragnet letters, to say what rounds or rounded billets they could furnish, with what deliveries and at what prices.

Many orders now on the books of leading steel companies for this year's delivery must go over to 1917. Weeks of almost unbroken hot weather have aggravated an oversold condition, and consumers have not yet felt the full effect of this exceptional curtailment.

The recent increase in domestic buying for the first half of 1917 still leaves the total much short of what some steel makers had expected. But at present high prices consumers are cautious, in spite of warnings that they may overstay.

Noteworthy in this connection is the report of the agricultural implement makers' committee which has been working to get lower prices on steel bars. The committee did not succeed, and it tells the associated buyers that each must now decide for himself how he shall provide for his steel for next year.

There are signs in the building trade that the high prices for steel have now fastened themselves in buyers' minds as likely to last longer than was counted on only lately. Work is to go forward, for example, on hotels at Washington and Baltimore, requiring about 8000 tons, and at St. Louis on a building calling for 6500 tons. The American Bridge Company has the contract for 10,000 to 12,000 tons for new Carnegie mill buildings in the Youngstown district.

Car rebuilding is a factor, rather than new car orders, 25,000 to 30,000 tons of steel being wanted for the former. The St. Paul is considering 5000 new cars, and the Pennsylvania Railroad has ordered 11,000 tons of plates and 4000 tons of shapes for car building.

Pittsburgh reports a tendency to exaggerate the shortage in semi-finished steel. Sheet and tin-plate works have been getting a satisfactory supply, and attention is called to the large amount of new steel capacity that has come into operation this year, with more to follow in the next sixty days. On the other hand strikes in equipment plants have held up the completion of new rolling mill capacity.

Black and galvanized sheets are weaker and the latter have sold at 4.15c. or under. For a Los Angeles aqueduct 9000 tons of blue annealed sheets will be wanted.

Chicago steel works are getting orders from unusual sources. An Ohio mill placed there a round tonnage of ingots for this year, paying \$40 at Chicago mill.

Pig-iron buying has been on a large scale, particularly in steel-making grades. A Youngstown steel company bought 15,000 tons of Bessemer and is in the market for basic. At St. Louis three consumers took 50,000 tons of basic, 35,000 tons going to Northern furnaces, in part on the basis of \$18 at Chicago. Southern Ohio purchases of basic have been a large factor in a total of 128,000 tons of pig iron through Cincinnati offices since Aug. 1. At Pittsburgh a steel foundry interest is in the market for 20,000 tons of basic and an eastern Pennsylvania steel works for 18,000 tons. Buffalo sales of foundry and basic irons were nearly 50,000 tons for the week, with as much still pending.

Pig-iron prices have been irregular. As usual there were low figures out. Chicago prices were revised downward to meet Southern competition. Southern Ohio iron sold at \$18, Ironton, as against \$18.50 only recently. In eastern Pennsylvania \$19, delivered, for basic iron was done, but \$19.50 is asked to-day. Some Buffalo sellers have advanced prices, also. At Cleveland large sales have been made—70,000 tons by one interest since Aug. 1, against 9000 tons in all July. Alabama iron is stronger. While \$13.50 iron has not disappeared, furnace sales are generally at a \$14 minimum.

Some reservations of Lake Superior ore for 1917 have been made—perhaps the earliest on record—and the bulk of buying for next year, it is now believed, will be done before navigation closes. Ore shippers insist that \$1 will not be generally paid for contract vessel room for next year and point to 2,500,000 tons additional ore that will be carried by new vessels ready by 1917.

Pittsburgh

PITTSBURGH, PA., Aug. 22, 1916.

Much publicity is being given to a reported shortage in the supply of semi-finished steel, but it is believed the reports are exaggerated. Sheet and tin-plate mills say they are getting quite satisfactory deliveries on sheet bars; in fact, better than two or three months ago. Although the excessively hot weather for nearly all of August has cut down the output of mills materially, a large amount of new open-hearth steel-making capacity has come in the market since the first of the year, and this is bound to help the situation, as much of it is already active, and more will be within the next 60 days. Nearly all buying negotiations now in pig iron, steel and finished products are for first quarter and first half of next year. There has been some buying of foundry iron for first quarter and first half, also some sales of tin plate to Pacific coast packers for first quarter, the price to be fixed later. The local situation seems stronger at this writing than it was Aug. 1, and sellers say there is no trouble in selling almost anything at good prices if they can make the deliveries. The foreign inquiry for semi-finished steel has fallen off. Prices on all finished lines of steel are firm, with the exception of black and galvanized sheets, while nuts and bolts have been advanced about 5 per cent. The output of coke is being

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

Pig Iron, Per Gross Ton:	Aug. 23, 1916.	Aug. 16, 1916.	July 26, 1916.	Aug. 25, 1915.
No. 2 X, Philadelphia...	\$19.50	\$19.50	\$19.75	\$15.50
No. 2, Valley furnace...	18.25	18.25	18.25	14.50
No. 2 Southern, Cin'ti...	16.40	16.40	16.90	13.90
No. 2, Birmingham, Ala.	13.50	13.50	14.00	11.00
No. 2, furnace, Chicago*	18.00	18.50	19.00	13.50
Basic, del'd, eastern Pa.	19.00	19.00	19.00	15.50
Basic, Valley furnace...	18.00	18.00	18.00	14.50
Bessemer, Pittsburgh...	21.95	21.95	21.95	16.45
Malleable Bess., Ch'go*	19.00	19.00	19.50	13.50
Gray forge, Pittsburgh...	18.70	18.70	18.70	14.45
L. S. charcoal, Chicago...	19.75	19.75	19.75	16.25

Billets, etc., Per Gross Ton:	Aug. 23, 1916.	Aug. 16, 1916.	July 26, 1916.	Aug. 25, 1915.
Bess. billets, Pittsburgh...	45.00	45.00	42.00	23.50
O.-h. billets, Pittsburgh...	45.00	45.00	45.00	24.00
O.-h. sheet bars, P'gh...	45.00	47.00	45.00	24.50
Forging billets, base, P'gh	69.00	69.00	69.00	29.00
O.-h. billets, Phila.....	46.00	45.00	45.00	32.00
Wire rods, Pittsburgh....	55.00	55.00	55.00	28.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.47½	1.47½	1.47½	1.25
O.-h. rails, heavy, at mill	1.56½	1.56½	1.56½	1.34
Iron bars, Philadelphia...	2.659	2.659	2.659	1.459
Iron bars, Pittsburgh...	2.60	2.60	2.50	1.30
Iron bars, Chicago.....	2.35	2.35	2.35	1.25
Steel bars, Pittsburgh...	2.60	2.60	2.50	1.30
Steel bars, New York...	2.769	2.769	2.669	1.519
Tank plates, Pittsburgh...	4.00	3.50	3.50	1.30
Tank plates, New York...	4.169	3.669	3.669	1.469
Beams, etc., Pittsburgh...	2.50	2.50	2.50	1.30
Beams, etc., New York...	2.669	2.669	2.669	1.519
Skelp, grooved steel, P'gh	2.35	2.35	2.35	1.30
Skelp, sheared steel, P'gh	2.45	2.45	2.45	1.35
Steel hoops, Pittsburgh...	3.00	3.00	2.75	1.35

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 23, 1916.	Aug. 16, 1916.	July 26, 1916.	Aug. 25, 1915.
Sheets, black, No. 28, P'gh	2.90	2.90	2.90	1.90
Galv. sheets, No. 28, P'gh	4.15	4.25	4.25	3.40
Wire nails, Pittsburgh...	2.60	2.60	2.60	1.65
Cut nails, Pittsburgh...	2.60	2.60	2.60	1.60
Fence wire, base, P'gh...	2.55	2.55	2.45	1.50
Barb wire, galv., P'gh...	3.45	3.45	3.35	2.40

Old Material, Per Gross Ton:

Iron rails, Chicago.....	18.50	18.50	18.50	12.25
Iron rails, Philadelphia...	20.00	20.00	20.00	17.00
Carwheels, Chicago....	11.50	11.50	12.00	11.75
Carwheels, Philadelphia...	15.50	15.50	15.50	13.50
Heavy steel scrap, P'gh...	16.00	16.00	16.25	14.00
Heavy steel scrap, Phila...	14.75	14.75	15.00	14.00
Heavy steel scrap, Ch'go...	15.25	15.25	15.25	11.75
No. 1 cast, Pittsburgh...	14.50	15.00	15.00	13.00
No. 1 cast, Philadelphia...	16.00	16.00	16.00	13.50
No. 1 cast, Ch'go (net ton)	11.50	11.50	11.50	10.00
No. 1 RR. wrot, Phila...	20.00	20.00	19.50	15.50
No. 1 RR. wrot, Ch'go (net ton)	15.25	15.25	15.25	11.00

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$2.85	\$2.75	\$2.75	\$1.50
Furnace coke, future...	2.50	2.50	2.50	1.75
Foundry coke, prompt...	3.25	3.25	3.25	2.00
Foundry coke, future...	3.50	3.50	3.50	2.25

Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	27.25	26.75	25.25	19.00
Electrolytic copper, N. Y.	26.87½	26.50	25.00	16.00
Spelter, St. Louis.....	9.50	8.75	10.25	12.25
Spelter, New York.....	9.75	9.00	10.50	13.50
Lead, St. Louis.....	6.50	5.90	6.00	4.35
Lead, New York.....	6.02½	6.00	6.20	4.50
Tin, New York.....	38.50	39.00	38.00	32.75
Antimony, Asiatic, N. Y.	13.50	10.00	13.50	28.50
Tin plate, 100-lb. box, P'gh	\$6.00	\$6.00	\$6.00	\$3.10

cut down by hot weather and scarcity of labor, and prices on spot coke are higher. The scrap market is showing a better feeling, and prices are firmer though no higher. The continuance of the present situation over the remainder of this year seems assured, and the outlook for the first half of 1917 is showing up stronger.

Pig Iron.—There is a decided scarcity in supply of Bessemer and basic iron, and prices are very firm, though showing no signs of advancing. Sales of about 3000 tons of basic have been made at \$18, Valley furnace. The American Steel Foundries, which bought early in the month 10,000 tons of basic iron for its Sharon and Alliance plants, is reported in the market for 20,000 tons or more, and the Standard Steel Works Company, Burnham, Pa., is also inquiring for basic. In foundry iron there has been a fairly heavy movement for the first half of 1917, the Westinghouse Air Brake Company being credited with buying 20,000 to 25,000 tons and other consumers probably 15,000 tons. Most of this went on the basis of about \$18.25, Valley, for No. 2, and some brought \$18.50, while sales of 2500 to 3000 tons of No. 2 for this year's delivery were made at \$18.50, Valley furnace. An active inquiry is in the market from Italy for 28,000 tons of Bessemer, but nothing has yet been done, owing largely to the uncertainty of ocean freights. When the inquiry was first received, the freight from New York to Italy was \$28, but when the inquiry became known the rate advanced to \$35. The Republic Iron & Steel Company has bought 15,000 tons of Bessemer iron for delivery over the remainder of this year to be supplied from Claire furnace of M. A. Hanna & Co. at Sharpsville, Pa., at the reported price of \$21 at furnace. It is stated the company is also in the market for a round lot of basic iron. We quote Bessemer iron at \$21; basic, \$18; gray forge, \$17.75 to \$18; malleable Bessemer, \$18.50 to \$19, and No. 2 foundry, \$18.25 to \$18.50, all at Valley furnace, the freight rate to the Pittsburgh and Cleveland districts being 95c. per gross ton.

Ferroalloys.—The local market is very dull, and prices on all grades are only fairly strong. The scare as regards the future supply of ferromanganese has passed, and domestic 80 per cent can readily be bought at \$165 to \$175 at furnace, but there is very little new

inquiry. Prices on the lower grades of ferrosilicon are only fairly strong. We quote 18 to 22 per cent spiegel-eisen at \$40 to \$45, and 25 to 30 per cent, \$55 to \$65, at furnace. On 50 per cent ferrosilicon we quote \$88 to \$89 in lots up to 100 tons; over 100 tons, \$87 to \$88, and over 600 tons, \$86 to \$87, all per gross ton, f.o.b. Pittsburgh. We quote Bessemer ferrosilicon as follows: 9 per cent, \$30; 10 per cent, \$31; 11 per cent, \$32; 12 per cent, \$33; 13 per cent, \$34.50; 14 per cent, \$36.50; 15 per cent, \$38.50, and 16 per cent, \$41. Seven per cent silvery is \$28.50; 8 per cent, \$29; 9 per cent, \$29.50; 10 per cent, \$30; 11 per cent, \$31, and 12 per cent, \$32. These prices are f.o.b. furnace, Jackson or New Straitsville, Ohio, or Ashland, Ky., all having a freight rate of \$2 per gross ton to Pittsburgh.

Billets and Sheet Bars.—The foreign inquiry for semi-finished steel in the form of billets and sheet bars has quieted down, no important inquiries having come out recently. There is a scarcity in the immediate supply of semi-finished steel, but this has been probably overestimated, as consumers report they are getting better deliveries on both billets and sheet bars than for some time. Much new capacity in open-hearth steel at Johnstown, Youngstown, Monessen and Pittsburgh has lately come in the market, and it is believed this will, to some extent at least, relieve the shortage. Prices on billets and sheet bars depend entirely on the necessities of the buyer and the kind of steel that is offered. A sale of 500 tons of sheet bars was made here a few days ago at considerably less than \$45, but most mills quote that figure when they quote at all. Three or four of the larger steel makers are badly oversold and are buying steel in the form of ingots wherever they can find it. We quote soft open-hearth and Bessemer billets and sheet bars at \$43 to \$45, maker's mill, Pittsburgh or Youngstown. Possibly odd lots could be picked up from dealers at the lower price. We quote forging billets at \$69 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take \$1 extra.

Structural Material.—New inquiry is fairly heavy. The American Bridge Company has taken 5500 tons for

a new power house for the Union Gas & Electric Company, Cincinnati, and will also furnish 10,000 to 12,000 tons for the new hoop and bar mills being built by the Carnegie Steel Company at McDonald, Ohio. Some of this material is already fabricated at its Ambridge shops. The Jones & Laughlin Steel Company has taken 150 tons for a theater building in San Francisco, and about the same quantity for Panama Canal work. Active jobs in the market include about 5000 tons for a hotel in Washington, D. C., and 3000 to 4000 tons for a hotel in Baltimore. The navy yard at Norfolk, Va., is also inquiring for 4000 tons. We quote beams and channels up to 15-in. at 2.60c. at mill for such deliveries as the mill can make, while small lots from stock for prompt shipment bring 3c. to 3.25c., Pittsburgh.

Steel Rails.—Very little is doing in the local market. The Carnegie Steel Company is filled to third quarter of 1917 on both standard sections and light rails, and, therefore, is not in position to quote for prompt delivery. The rerolling rail mills are taking a good part of the new business being offered in light rails by shading prices on new steel rails from \$1 to \$2 per ton. We quote 25 to 45 lb. sections at \$47; 16 and 20 lb., \$48; 12 and 14 lb., \$49; and 8 and 10 lb., \$50, in carload lots, f.o.b. at mill, the usual extras being charged for less than carload lots. We quote standard section rails of Bessemer stock at 1.47½c., and of open hearth 1.56½c., Pittsburgh.

Plates.—While there is very little demand from the car builders, the shipyards and boilermakers are specifying heavily, and plates are probably the scarcest item on the whole list. Leading mills have their entire output sold for this year, and have taken large contracts for delivery in first quarter and first half of 1917. About 3000 tons of plates are wanted for caissons for the Panama Canal, but it is doubtful if local mills can take any of this business and make the desired deliveries. The minimum mill price on plates is 3c. for such deliveries as the mills can make, which would be in first quarter and first half of next year, while for shipment in two to three months 4c., and even higher, is being paid. We quote ¼-in. and heavier plates for delivery at convenience of the mills at 3c., and for shipment in two to four months at 4c. to 4.10c., Pittsburgh.

Sheets.—The output of sheets is being materially cut down by the shortage in labor, many of the hands refusing to work more than four days a week. Some large inquiries for blue annealed and special grades of sheets are in the market from automobile builders for last quarter and first half of next year. The new demand for sheets from carbuilders is quiet, but on blue annealed and electrical sheets the mills are sold up for four and five months ahead. On thin black and galvanized, fairly prompt deliveries can be made by some mills. The lower prices on spelter are affecting galvanized sheets, which have sold in some cases at 4.15c. or less. Prices on Bessemer black sheets are not quite so firm, 2.90c. having been shaded in some cases. We quote blue annealed sheets, Nos. 9 and 10, at 3c. to 3.25c., for delivery at convenience of the mill. We quote No. 28 Bessemer and open-hearth black sheets at 2.90c. to 3c.; No. 28 galvanized, Bessemer, and open-hearth, 4.15c. to 4.25c.; Nos. 22 and 24 black plate, tin-mill sizes, H. R. & A., 2.90c.; Nos. 25, 26 and 27, 3c. to 3.10c.; No. 28, 3.10c. to 3.15c.; and No. 29, 3.20c. to 3.25c. These prices are for carloads and larger lots, f.o.b. mill, Pittsburgh.

Tin Plate.—This is the height of the canning season and pressure on the mills for deliveries of tin plate is enormously heavy. There is a good deal of inquiry for first quarter and first half of 1917, and some has been sold to Pacific coast packers for first quarter, the price to be determined when prices are fixed on the 1917 business. Makers of tin plate have had a severe lesson this year in selling for a year ahead, and it is likely that determined efforts will be made, when the time comes to fix prices, to make them good only for the first six months of 1917. Foreign demand is heavier, one inquiry being for 90,000 boxes for England, presumably for shipment to the Orient. To regular customers, mills are quoting tin plate from stock at \$5.50, while production tin plate is quoted at \$5.75 and up to \$6 to the domestic trade. For export, \$6 to \$6.25 per

base box is quoted. We quote 8-lb. coated ternes at \$8.50 to \$8.75 for 200 lb., and \$8.75 to \$9 for 214 lb., all f.o.b. Pittsburgh.

Skelp.—New inquiry is quiet, but the two or three local mills that make skelp are sold up for the next several months. Prices are firm, but without change. We quote grooved steel skelp at 2.35c. to 2.40c.; sheared steel skelp, 2.45c. to 2.50c.; grooved iron skelp, 2.70c. to 2.80c., and sheared iron skelp, 3c. to 3.10c., all delivered to consumers' mills in the Pittsburgh district.

Cold-Rolled Strip Steel.—Nearly all consumers are covered for the remainder of this year, and there is a good deal of inquiry for delivery in first quarter and first half of 1917. So far the makers have not sold into next year, but may agree to do so in the near future. All contracts contain a very tight non-cancellation clause, and in the event of a decline in the market the consumers will likely be compelled to take the material. On contract we quote cold-rolled strip steel at \$6 per 100 lb., base, and on small lots for fairly prompt delivery, from \$6.50 to \$7. Extras, standard with all the mills, were printed on page 810 of THE IRON AGE of March 30.

Wire Rods.—To a few of the very largest consumers some contracts for soft Bessemer and open-hearth rods have recently been taken by the mills at \$50, but for current demand the mills report no trouble in getting \$55 to \$60 at mill. We note sales of 1000 to 1200 tons of soft Bessemer and open-hearth rods for delivery over the next two or three months at \$60. We quote soft Bessemer, open-hearth and chain rods at \$55 to \$60 per ton, f.o.b. Pittsburgh.

Nuts and Bolts.—Prices of nuts and bolts have again been advanced about 5 per cent, due to the increased cost of steel and also to the heavy demand, which makers state is much beyond their capacity. Most large consumers are covered for the remainder of this year and some into the first quarter of 1917, at lower than the new prices, and specifications are active. Deliveries are back six to eight weeks or longer, and all makers are running to as full capacity as the supply of steel and labor will permit. The very hot weather of the past month or more has cut down the output, and makers are not catching up on back deliveries. The new discounts are as follows, delivered in lots of 300 lb. or more, where the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 50 and 5 per cent; small, cut thread, 40, 10 and 5 per cent; large, 35 and 5 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 50 and 10 per cent; small, cut thread, 50 per cent; large, 40 and 5 per cent.

Machine bolts, c. p. c. and t. nuts, small, 40 and 10 per cent; large, 35 per cent. Blank bolts, 40 and 5 per cent. Bolt ends, h. p. nuts, 40 and 5 per cent; with c. p. nuts, 35 per cent. Rough stud bolts, 15 per cent. Lag screws (cone or gimlet point), 50 and 5 per cent.

Forged set screws and tap bolts, 10 per cent. Cup and round point set screws, case hardened, 60 per cent. Square or hexagon head cap screws, 55 per cent. Flat, button, round or fillister head cap screws, 30 per cent.

Nuts, h. p. sq., tapped or blank, \$2.70 off list; hex., \$2.70 off. Nuts, c. p. c. and t. sq., tapped or blank, \$2.40 off; hex., \$2.80 off. Semi-finished hex. nuts, 60 and 5 per cent. Finished and case-hardened nuts, 60 and 5 per cent.

Rivets, 7/16 in. in diameter and smaller, 45, 10 and 5 per cent.

Rivets.—Most consumers are covered over this year and some into first quarter of 1917, but the new demand is fairly active. Makers report specifications coming in freely. There is still much delay in getting deliveries of steel from the mills, and this, with the hot weather, is cutting down the output. Foreign inquiry is fairly active. Makers' prices, but which are being shaded in some cases by jobbers, are as follows: Buttonhead structural rivets, ½ in. in diameter and larger, \$4 per 100 lb., base, and conehead boiler rivets, same sizes, \$4.10 per 100 lb., base, f.o.b. Pittsburgh. Terms are 30 days net, or one-half of 1 per cent for cash in 10 days.

Railroad Spikes.—No large inquiries are in the market, and specifications from railroads are not coming

very freely. Spikes are probably the quietest item in the whole list of finished steel. Makers are diverting the steel that ordinarily would go into spikes to other products for which there is a better demand and at good prices. In the absence of new buying, prices are as follows:

Standard railroad spikes, $4\frac{1}{2}$ x 9/16 in. and larger, \$2.65 to \$2.75; railroad spikes, $\frac{1}{2}$ and 7/16 in., \$2.75 base; railroad spikes, $\frac{3}{4}$ in. and 5/16 in., \$3.05 base; boat spikes, \$2.80 base, all per 100 lb., f.o.b. Pittsburgh.

Wire Products.—Mills report prices very firm and state that specifications are active. As is usual in the wire trade, customers covered on their needs for some time ahead before the recent advance. In spite of the high prices ruling, it is believed the fall trade in fence wire will be normal. The new demand for wire and wire nails is not very active, but there is practically no barb wire to be had, the heavy foreign and domestic demand having taken the available supply over the remainder of the year. Foreign demand for barb wire has quieted down. Prices to the large trade, effective from Aug. 7, are as follows: Wire nails, \$2.60, base, per keg; galvanized, 1 in. and longer, including large head barbed roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire is \$2.65 per 100 lb.; annealed fence wire, 6 to 9, \$2.55; galvanized wire, \$3.25; galvanized barb wire and fence staples, \$3.45; painted barb wire, \$2.75; polished fence staples, \$2.75; cement coated nails, \$2.50, base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. No change was made in discounts on woven wire fencing, which remain at 61½ per cent off list for carload lots, 60½ per cent for 1000 rod lots and 59½ per cent for small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—Local steel-bar mills disclaim having taken any of the orders placed lately by the implement makers for delivery for the first half of 1917, and it is believed most of this business was placed with Chicago and other Western mills. The new demand for steel bars is fairly active, and specifications are very heavy. We quote merchant steel bars at 2.60c. at mill for delivery at convenience of the mill, which would be in last quarter of this year or first quarter of 1917, while for prompt shipment from warehouse 3c. to 3.10c. is quoted. We quote refined iron bars at 2.60c. to 2.70c., and railroad test bars, 2.70c. to 2.80c., f.o.b. Pittsburgh.

Shafting.—The new demand for shafting is reported heavier than for several months. Nearly all consumers are covered over the remainder of this year, and large inquiries are out from automobile builders and the screw stock machine trade for first half of 1917 shipment. We quote cold-rolled shafting at 20 to 15 per cent off in carload lots for delivery in last quarter of this year and first quarter of 1917, and 10 per cent off in less than carload lots, f.o.b. Pittsburgh, freight added to point of delivery.

Merchant Steel.—Mills are sold up over the remainder of this year and specifications are heavy. Prices on small lots are about as follows: Iron-finished tire, $\frac{1}{2}$ x $1\frac{1}{2}$ in. and larger, 2.50c., base; under $\frac{1}{2}$ x $1\frac{1}{2}$ in., 2.60c.; planished tire, 2.70c.; channel tire, $\frac{3}{4}$ to $\frac{7}{8}$ and 1 in., 2.85c. to 2.95c.; $1\frac{1}{2}$ in. and larger, 3.25c.; toe calk, 2.95c. to 3.05c., base; flat sleigh shoe, 2.70c.; concave and convex, 2.75c.; cutter shoe, tapered or bent, 3.25c. to 3.35c.; spring steel, 2.95c. to 3.05c.; machinery steel, smooth finished, 2.75c.

Hoops and Bands.—The minimum mill price on steel hoops is 3c. and on steel bands 2.60c. for such deliveries as the mills can make, with extras on the latter as per the steel-bar card. For prompt shipment steel bands bring 2.75c. and higher.

Wrought Pipe.—The Royal Dutch Company, Ltd., which has very extensive oil operations in Kansas, Oklahoma and California, is reported to have closed an option with a Youngstown mill for 470 miles of 10-in. line pipe. It is also said that the Sinclair Oil & Refining Company, a large operator in the Oklahoma district, is contemplating erecting warehouses in Chicago and St. Louis, and it is reported will buy 800 miles or more of

8-in. line pipe, but the inquiry has not yet come to local mills. On lap-weld sizes of iron and steel pipe, mills are sold up for five to six months, but can make prompt deliveries on butt-weld sizes. It is stated that as yet there have been no cancellations of contracts for oil-well supplies, despite the severe decline in prices of crude oil, but the new demand has fallen off considerably. Discounts on galvanized and black iron and steel pipe are given on another page.

Boiler Tubes.—On both locomotive and merchant tubes the mills report they are sold up for eight to ten months or longer, and specifications against contracts are very heavy. Discounts on iron and steel boiler tubes are given on another page.

Coke.—The hot weather and shortage in labor are cutting down the output considerably, and prices on the best grades of spot furnace coke are higher. Sales of 5000 to 6000 tons have been made at \$2.85, and it is said \$3 has been done in a few cases. The Youngstown Sheet & Tube Company has started half of its 204 Koppers by-product ovens, and the remainder will be started about Sept. 10. We quote best grades of blast-furnace coke for prompt shipment at \$2.75 to \$2.85, and on contracts about \$2.50, but there is no inquiry on the latter, as furnaces covered some time ago. We quote best grades of 72-hr. foundry coke, for prompt shipment, at \$3.10 to \$3.25, and on contracts \$3.25 to \$3.50 per net ton at oven. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended Aug. 12 as 403,340 net tons, a slight gain over the previous week, but a loss of about 50,000 tons on the normal output.

Old Material.—There is a better feeling in the local scrap trade, especially on steel-making scrap. For several weeks there has been an embargo on steel scrap routed to the Carnegie Steel Company at Munhall, Pa., and much of this material has been pressed on the open market. The market on turnings is dull and prices are weak and lower. There is some movement in low phosphorus melting scrap. We note sales of about 2000 tons of the latter at about \$20, delivered, and also sales of 4000 to 5000 tons of selected heavy melting steel scrap at about \$16.25, delivered at Sharon, Pa. Prices now being quoted by dealers for delivery in Pittsburgh and points that take the same rates of freight, per gross ton, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	\$16.00 to \$16.25
No. 1 foundry cast	14.50 to 14.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.50 to 17.00
Hydraulic compressed sheet scrap.	13.50 to 14.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	11.25 to 11.50
Bundled sheet stamping scrap.	10.25 to 10.50
No. 1 railroad malleable stock.	14.50 to 14.75
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock.	19.75 to 20.00
Iron car axles	28.00 to 28.50
Steel car axles	28.00 to 28.50
Locomotive axles, steel	33.00 to 35.00
No. 1 busheling scrap	14.00 to 14.25
Machine-shop turnings	7.00 to 7.25
Old carwheels	13.25 to 13.50
Cast-iron borings	8.00 to 8.25
*Sheet bar crop ends	17.00 to 17.50
No. 1 railroad wrought scrap.	18.00 to 18.75
Heavy steel axle turnings	10.50 to 10.75
Heavy breakable cast scrap.	12.25 to 12.50

*Shipping point.

Chicago

CHICAGO, ILL., Aug. 22, 1916.

As obligations pile up on the mill books, production steadily falls behind expectations. The full measure of curtailed output chargeable to the prolonged high temperatures has not yet been felt by the consumer. Equipment manufacturers, hampered by labor shortage and strikes, are also holding up mill construction work, delay in the completion of which will wreck many delivery promises. The outpouring of inquiry for steel in all forms continues. Shell steel orders, in seemingly endless quantity, may still be had almost for the asking. Domestic inquiry defies all geographical disadvantages, and Chicago mills are asked to quote for delivery in

all parts of the country. A revival of interest in pig iron has developed to parallel that in steel. Buying of the past week was not without interesting features. Surprising inquiry for rail fastenings brought out wants aggregating 27,000 tons of tie-plates, of which 7000 tons has been placed. An Ohio sheet mill took a round tonnage of ingots from a local mill for last half delivery, paying \$40 per ton. Figures are being sought on 9000 tons of blue annealed sheets for a Los Angeles aqueduct. Recent activity in carbuilding involves about 12,000 cars of various types, and last week's buying of car steel was an important part of the tonnage placed. Steel-bar sales ran into large totals, but individual buyers are but meagerly covered on the basis of their normal requirements. Price changes include an advance of 5 per cent in bolt discounts, a reduction of \$7 per ton in the store price of galvanized sheets and an adjustment of Northern pig-iron quotations to the level of competition with Southern prices.

Pig Iron.—The steady increase of inquiry marks a general awakening of buyers to the protection of their requirements for the fourth and first quarters. The scattered inquiry for foundry and malleable iron, which preceded recent large sales of basic iron, has grown into a very general interest. Of approximately 25,000 tons of basic iron bought for St. Louis delivery, a part was placed in the South, a part bought from the Mississippi Valley Iron Company at St. Louis, and the balance placed at Chicago. For the Northern basic \$19.50, delivered, was paid, which is equivalent to a Chicago furnace quotation of \$18. The concession made by the Northern furnaces in connection with this business also indicates their attitude on other grades of iron. Recent quotations on foundry iron, where Southern competition has been encountered, have been on the basis of \$18 at furnace. Inquiry now in the market ranges from 500 to 2000 tons, and represents prospective buying in a large number of lines of trade. In the period during which Southern prices have been relatively low, a considerable quantity of iron has been placed in the South made up largely of export iron and miscellaneous small lots for domestic consumption. The situation there has been accordingly strengthened and, having touched \$13.50, the market has reacted to \$14 for prompt shipment and \$14.50 for future delivery, some furnaces asking as much as \$15 for the first quarter. Charcoal producers have shared in the selling, one transaction of 1000 tons being noted. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of \$1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5.....	\$19.75
Lake Superior charcoal, No. 1.....	20.25
Lake Superior charcoal, No. 6 and Scotch....	20.75
Northern coke foundry, No. 1.....	\$18.50 to 19.00
Northern coke foundry, No. 2.....	18.00 to 18.50
Northern coke foundry, No. 3.....	17.50 to 18.00
Southern coke, No. 1 f'dry and 1 soft.....	18.50 to 19.00
Southern coke, No. 2 f'dry and 2 soft.....	18.00 to 18.50
Malleable Bessemer	19.00
Basic	18.00 to 18.50
Low phosphorus	34.00
Silvery, 8 per cent	29.50
Bessemer ferrosilicon, 10 per cent.....	32.50

Rails and Track Supplies.—An interesting and unexpected feature of the changed tone in the steel market has been a revival of interest on the part of some of the railroads in the matter of track supplies. Inquiry for tie-plates, track bolts, spikes and angle bars now current outruns ability of the steel mills to meet it. An order for 7000 tons of tie-plates was placed last week, and there remain in the market the inquiries of the Rock Island and Santa Fe railroads for a total of about 20,000 tons. Quotations are as follows: Standard railroad spikes, 2.75c., base; track bolts with square nuts, 3.25c. to 3.50c., base, all in carload lots, Chicago; tie-plates, \$50, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, \$33, base; open-hearth, \$35; light rails, 25 to 45 lb., \$40; 16 to 20 lb., \$41; 12 lb., \$42; 8 lb., \$43; angle bars, 2c., Chicago.

Structural Material.—A résumé of the activity of the railroads in the matter of car buying presents a

total of no small proportions. The New York Central Lines have bought an additional 1000 cars; the Chicago, Milwaukee & St. Paul is considering the taking of prices on 5000; the Kansas City Southern is in the market for 1900, the St. Louis & San Francisco for 1500, the Nickel Plate for 1000 (in addition to which it is having 500 cars rebuilt), while the Illinois Central has placed 1000 cars with the American Car & Foundry Company for rebuilding. In evidence of this activity a large proportion of the steel placed last week consisted of structural shapes and plates suitable for carbuilding. Among the contracts for fabricated steel the more important were the Burlington's bridge requirements amounting to 1500 tons, placed with the American Bridge Company, and 1000 tons for the new buildings of the Arizona Hercules Copper Company, awarded to the El Paso Bridge & Iron Company. The South Halstead Street Iron Works will supply 450 tons for Kling Brothers' new foundry at Chicago, and the Minneapolis Steel & Machinery Company took 360 tons for the Montana Power Company. The Minneapolis & St. Louis Railroad placed 115 tons of bridge steel with the leading fabricator. In the matter of delivery of plain material from mill, better delivery quotations are being offered in this market by some of the Eastern mills than can be had from local interests. Recent bookings by local mills have not offered anything better, even to regular trade, than fourth and first quarter rolling, which delivery is also predicated very largely upon the completion of new capacity. We quote for Chicago delivery of structural shapes from mill 2.789c.

We quote for Chicago delivery of structural steel from jobbers' stocks 3.10c.

Plates.—The amount of inquiry for plates was less important last week, although there is a continuous demand for materials for shipbuilding. Sales of tank plates 108 in. wide, for prompt delivery, at 4c., Pittsburgh, and other lots of plates of average width at 3c., for fourth quarter delivery, indicate the range of the market. There is every indication that the shortage of plates is likely to be accentuated rather than relieved. We quote for Chicago delivery of plates from mill at its convenience 3.189c. For prompt shipment we quote 3.689c. to 4.189c.

We quote for Chicago delivery of plates out of jobbers' stocks 3.50c.

Sheets.—While a sympathetic strengthening of the market is in evidence, prices are not quotably higher. For roofing sheets, 2.75c., Pittsburgh, can still be done and for No. 28 standard black sheets 2.85c. Inquiry for blue annealed sheets includes one lot of 9000 tons for the Los Angeles aqueduct. There is no great change in galvanized sheets, prices being still too high to be attractive in the unsettled condition of the market. We quote for Chicago delivery, blue annealed, No. 16 and heavier, 3.089c. to 3.339c.; box annealed, No. 17 and lighter, 2.939c. to 3.039c.; No. 28 galvanized, 4.289c. to 4.389c.

The price of galvanized sheets out of store has declined to a basis of 4.65c., an adjustment of \$7 per ton from the previous minimum quotation. We quote for Chicago delivery of sheets out of stock, minimum prices applying on bundles of 25 or more, as follows: No. 10 blue annealed, 3.40c.; No. 28 black, 3.10c. to 3.20c.; No. 28 galvanized, 4.65c. to 4.75c.

Bars.—The quantity of steel bars on the books of the mills continues to roll up at an impressive rate. There remains a large amount of export steel which may be had for the taking, while domestic inquiry is circulating from mill to mill in an effort to find lodgment on someone's order book. How many consumers are to be satisfied is a problem. Unless the demand for agricultural implements, for example, shall shrink well within the conservative estimates of implement manufacturers, their purchases thus far can hardly prove adequate, and predictions are general that the keenest shortage will prevail before the end of the first quarter. Rail-carbon bars and iron bars are in fair demand, and in the latter case the mills are well filled for the immediate future, but no special activity has been manifested. We quote mill shipment, Chicago, as follows: Bar iron, 2.35c.; soft steel bars, 2.789c.;

hard steel bars, 2.50c.; shafting, in carloads, 20 per cent off; less than carloads, 15 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 2.10c.; bar iron, 3.10c.; reinforcing bars, 3.10c. base with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 10 per cent off.

Rivets and Bolts.—Following the advance in bars and wire rods, bolt makers have advanced their prices approximately 5 per cent, though the new discounts have not yet been announced. Following a resumption of interest on the part of buyers in the last few weeks, this advance is expected to result in a sharp increase of inquiry. Subject to the above advance we quote carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 50-10-5; cut thread, 50-5; larger sizes, 40-5; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, with hot pressed square nuts, 50-10-10; cut thread, 50-10; larger sizes, 40-10-5; gimlet-point coach screws, 60; hot pressed nuts, square, \$2.90 off per 100 lb.; hexagon, \$2.90 off. Structural rivets, $\frac{3}{4}$ to $1\frac{1}{4}$ in., 4c. to 4.15c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 3.75c. to 4.10c.; boiler rivets, 3.85c.; machine bolts up to $\frac{3}{4}$ x 4 in., 60-10; larger sizes, 50-10; carriage bolts up to $\frac{3}{4}$ x 6 in., 60-5; larger sizes, 50 off; hot pressed nuts, square, \$3.25, and hexagon, \$3.25 off per 100 lb.; lag screws, 65.

Wire Products.—The wire market presents one of the incongruities of the situation in that plain wire is held at a higher price than nails. There is a suggestion in the fact that as the plain wire quotation covers fourth quarter deliveries, wire nails, which are not sold so far ahead, may by that time reach a relatively normal basis. The wire nail trade shows some improvement, but the demand for fencing is exceedingly light. We quote as follows per 100 lb.: Plain wire, Nos. 6 to 9, base, \$2.839; wire nails, \$2.789; painted barb wire, \$2.939; galvanized barb wire, \$3.639; polished staples, \$2.939; galvanized staples, \$3.639; all Chicago.

Old Material.—The prolonged inactivity of the scrap market appears to be chargeable to circumstances not commonly experienced. Melters of scrap, other than steel, while they appear willing to buy at a price, seem not sufficiently in need of further material to make the necessarily attractive offers. On the other hand, sellers of scrap apparently have no interest whatever in disposing of their holdings on the basis of any prices in line with the market. This indifference is making the filling of outstanding short orders for steel scrap a tedious process, and is responsible for a slight stiffening of prices for these grades. In the coincidence of the very limited buying by consumers in the open market and the unusually limited offers of scrap by the railroads there is found the suggestion that an unusual amount of scrap is moving from producer to consumer on an exchange basis. The only important railroad list of the week comes from the Rock Island and carries nearly 5000 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$18.50 to \$19.00
Relaying rails	19.50 to 20.50
Old carwheels	11.50 to 12.00
Old steel rails, rerolling	15.75 to 16.00
Old steel rails, less than 3 ft.	15.75 to 16.00
Heavy melting steel scrap	15.25 to 15.50
Frogs, switching and guards, cut apart	15.25 to 15.50
Shoveling steel	14.75 to 15.00
Steel axle turnings	9.25 to 9.75

Per Net Ton	
Iron angles and splice bars	\$18.75 to \$19.00
Iron arch bars and transoms	19.50 to 20.00
Steel angle bars	13.75 to 14.25
Iron car axles	25.50 to 26.00
Steel car axles	28.00 to 28.50
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	14.50 to 14.75
Cut forge	14.50 to 14.75
Pipes and flues	11.00 to 11.25
No. 1 busheling	12.50 to 12.75
No. 2 busheling	9.00 to 9.25
Steel knuckles and couplers	14.00 to 14.50
Steel springs	14.50 to 15.00
No. 1 boilers, cut to sheets and rings	10.25 to 10.75
Boiler punchings	13.75 to 14.25
Locomotive tires, smooth	20.00 to 20.50
Machine-shop turnings	5.50 to 6.00
Cast borings	6.00 to 6.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.25 to 9.75
Grate bars	10.00 to 10.25
Brake shoes	9.75 to 10.25
Railroad malleable	11.25 to 11.75
Agricultural malleable	10.75 to 11.25

Cast-Iron Pipe.—Bids for 950 tons of pipe for Chicago, with one exception, exceeded the estimates, and new bids are likely to be asked. All bids were rejected at Toledo, Ohio, and no award has been made at Ravenna. Prospective municipal lettings include 1300 tons at Hamilton, Ind., and 1800 tons at St. Louis. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$33.50 to \$34; 6-in. and larger, \$30.50 to \$31, with \$1 extra for class A water pipe and gas pipe.

Philadelphia

PHILADELPHIA, PA., Aug. 22, 1916.

A less heavy tonnage of steel was placed under contract in this district last week and less feverishness attended sales, but specifications against contracts with some of the larger mills were in greater volume than for several weeks. The market is still flooded with inquiries for steel to be used in the manufacture of war munitions, especially for export, exceeding 250,000 tons; but two of the largest eastern Pennsylvania companies, having sold their capacity for shell bars up to June and July of 1917, will no longer entertain such propositions, while a third mill steadily adheres to the attitude of reserve that it has maintained on shell steel since the beginning of the war. Shipyards and railroads have placed additional contracts for plates and shapes aggregating between 30,000 and 40,000 tons. British interests closed for a moderate tonnage of marine steel for export to Hong Kong, and Japanese interests bid urgently for marine boiler plates. Several orders for forging and rerolling billets, aggregating probably 25,000 tons, were taken for domestic shipment. Foreign interests, still urgently in the market, found it difficult to buy either ingots or semi-finished steel in appreciable tonnages. The position of blast-furnace interests was further improved by more numerous small sales, larger shipments and reduced stocks, together with a substantial gain in inquiries for both steel-making and for foundry grades.

Pig Iron.—At the regular monthly meeting of the Eastern Pig Iron Association, held last week, it was shown that stocks on furnace banks at the beginning of August were the smallest in several years, shipments on contracts having made substantial gains on current output. Sales during the first half of August were greater than the total sales in July. More interest in the market was evidenced by consumers through increased buying of small lots and by frequent inquiries for shipment over the first quarter and first half of next year. Sales for the week in this immediate district amounted to about 13,000 tons, including 6000 tons of basic taken by a Schuylkill Valley steel maker at \$19, delivered, for this year's shipment. Little basic, however, is now available under \$19.50, delivered. Two lots of 1500 to 2000 tons of basic are reported to have been sold at \$18, Valley furnaces. The other sales were made up of small lots of foundry grades, the largest being 1000 tons. Two Buffalo furnaces have advanced prices and the Virginia Iron, Coal & Coke Company has put out a higher schedule for shipment over the remainder of 1916 and also for shipment over the first quarter or first half of 1917. No. 2 X Virginia is now quoted at \$18.50, No. 2 plain at \$18, No. 3 foundry at \$17.75 and No. 4 foundry at \$17.50, furnace. As the market hardens, Eastern furnaces are more indifferent about selling for shipment after Jan. 1 next, except at higher prices. In the Eastern territory there is scarcely a large consumer that is not in the market, tentatively or otherwise, and inquiries are out for about 100,000 tons, one-fourth of which comes from melters in the territory tributary to Philadelphia. It is a significant fact that some Virginia furnaces need prodding to make shipments on orders taken several weeks ago for prompt delivery. On the other hand, some foundries with pressing orders for castings are unable to assemble enough molders to execute contracts promptly and consequently are holding back or diverting shipments of pig iron. The labor problem continues serious in most branches of the industry. In some quarters uneasiness is again developing regarding the ore supply. The offerings of resale iron are less annoying, but a

few lots remain to be absorbed. Less is heard of export sales, but a few substantial inquiries for steel-making grades are still in the market. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa. No. 2 X foundry.....	\$19.50 to \$20.00
Eastern Pa. No. 2 plain.....	19.25 to 19.75
Virginia No. 2 X foundry.....	20.50 to 21.00
Virginia No. 2 plain.....	20.25 to 20.75
Gray forge	18.50 to 19.00
Basic	19.00 to 19.50
Standard low phosphorus.....	34.00

Iron Ore.—Arrivals of foreign ore at this port in the week ended Aug. 19, included 7600 tons from Cuba, valued at \$22,800; 6900 tons from Chile, valued at \$8,185, and 5104 tons from Sweden, valued at \$26,286.

Billets.—Crude and semi-finished steel is urgently wanted for both domestic and foreign shipment and prices are higher. Two eastern Pennsylvania mills have been disappointed in a search for ingots. Re-rolling billets are difficult to buy under \$46 and sales have been made up to \$50, while small lots are held at \$55. Several lots of forging billets have been sold at \$65, f.o.b. Eastern mill. Sales of re-rolling and forging billets have aggregated 25,000 tons or more, and there are numerous other inquiries for lots ranging from 1000 to 25,000 tons each from domestic consumers and from exporters. One interesting foreign inquiry is for 7-in. square billets and another for 10½-in. diameter forgings, the latter for 10-in. shells.

Ferroalloys.—The market is quiet for ferromanganese and spiegeleisen, but there is still a fair demand for ferrosilicon, especially for the lower grades. Foreign ferromanganese is held at \$170 to \$175 per ton, seaboard, and domestic is quotable at the same prices. Italy and Japan are still in search of alloys. During the week ended Aug. 19, 400 tons of English ferromanganese, valued at \$26,009, were imported at Philadelphia. Bids have been submitted on 1500 to 2000 tons of 10 per cent ferrosilicon for 1917 shipment. Fifty per cent ferrosilicon is firm at \$86 to \$88 and 11 per cent at \$31, Pittsburgh. Spiegeleisen is held at \$50, furnace.

Plates.—Shipyards and railroads placed orders in the last few days for 20,000 tons of plates and prospective orders for 10,000 to 15,000 tons are developing. The Sun Shipbuilding Company offered a contract for 14,800 tons of plates and shapes for four tank boats to a Pittsburgh mill. Half was accepted for delivery over the first five months of 1917 and the other half is reported to have gone to two eastern Pennsylvania mills. Of the total, 10,000 tons were plates. Another Atlantic coast yard is asking for prices on 8000 to 10,000 tons of plates for shipment over the first half of 1917. There is a more active demand for small lots of boiler and tank plates for prompt shipment, and among the small sales was one lot of 1000 tons of tank plates at 4c. for shipment within 60 days. The Cramp Shipbuilding & Engine Company is reported to be keeping open several ways to build battle-ships for the Government. The largest interests and one eastern Pennsylvania mill are said to have reserved plate rolling space for a heavy tonnage for Government needs. Among the foreign orders taken were 4000 tons for Italy, which went to a Pittsburgh mill, and 1000 tons sold to a British interest for export to China. Japanese shipbuilders, after placing an order for several thousand tons of hull plates, are pressingly bidding for a few hundred tons of marine boiler plates. The Pennsylvania Railroad placed orders for 11,000 tons of plates and 4000 tons of shapes for car construction at Altoona, half of the tonnage to be rolled at Pittsburgh and the other half in eastern Pennsylvania; deliveries are to be made over the first half of 1917. Sales for next year's delivery were made at 3 to 3.50c., the outside price for export.

Bars.—Although the market is still flooded with inquiries for shell bars—some estimates exceeding 250,000 tons, with billets and forgings—for direct export and for domestic shipment, one Eastern interest having taken an additional contract for loaded shells in the past few days, few sales of importance have

been made, as bar-mill capacity in this section has been sold up to July, 1917. Several options on structural bars have been exercised in the past week and additional sales made at 2.75c., base, Pittsburgh. Marine bars have been sold at 2.75c. to 3c. for early shipment. Shell bars have sold in a small way at 4c.; the recent large contracts are said to have commanded 3.75c. to 4c., base, Pittsburgh. Small manufacturers are meeting increasing difficulty in obtaining even small tonnages for shipment over the first half of 1917. Iron bars are selling more readily to railroads, to shipyards and to structural concerns, at 2.50c., base, Pittsburgh, or 2.659c., Philadelphia.

Structural Material.—Included in the Sun Shipbuilding purchases, referred to elsewhere, were 4800 tons of structural shapes. Other shipbuilders also placed orders, and contracts for 5000 to 6000 tons plain shapes are now pending. The Pennsylvania Railroad bought about 4000 tons for car construction. Tank ships ordered several hundred tons of shapes, with plates, at 2.75c. for prompt shipment. A few fabricators and manufacturers exercised options at 2.50c., base, Pittsburgh, during the past week, but other sales were made at 2.60c., base, for shipment over the first quarter of 1917. Some of the western Pennsylvania mills are refusing to accept new contracts under 2.80c., base, or \$2 per ton over the recognized official base. In fact, the mills are disposed to discourage structural business for any delivery because other rollings are more lucrative. The Southern Railroad is reported to have placed orders for 1500 tons of bridge work, but the balance of the 7000 tons upon which tenders were made is still held in abeyance. The general contract for the Franklin Trust Company building has been awarded to Nixon & Dugan. Plans for the Southern Hotel, to be constructed at Baltimore, are now going to fabricators; 1000 to 1200 tons of steel will be needed.

Sheets.—The demand for blue annealed sheets continues active and the market is strong at 3.159c. to 3.659c., Philadelphia, for No. 10, according to tonnage required, time of delivery and the character of the specifications. Automobile manufacturers are still prominent among buyers.

Coke.—The tone of the market is firmer, with some improvement in the demand for foundry grades for early shipment. Operators still experience difficulty in obtaining forkers in ample number, and the supply of open cars is inadequate to meet the demand. Foundry coke for prompt shipment sells at \$3.25 and contract coke at \$3.50 to \$3.75 per net ton at oven. Furnace coke is quiet at \$2.75 for spot and \$2.50 for contract. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—The market still suffers from the effect of railroad embargoes against many steel plants in both eastern and western Pennsylvania. In this section the congestion is particularly severe. It is estimated that fully 50,000 tons of steel scrap has been accumulated, with very little outlet at the moment. It is notable, however, that low phosphorus scrap is firmer and higher. A few sales of heavy steel melting scrap have been made at \$15. Wrought pipe is firmer and 50c. per ton higher, while cast borings have suffered a further decline of 50c. per ton. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$14.75 to \$15.25
Old steel rails, re-rolling.....	17.00 to 18.00
Low phos. heavy melting steel scrap.....	21.25 to 23.75
Old steel axles (nominal).....	30.00 to 31.00
Old iron axles (nominal).....	28.00 to 29.00
Old iron rails	20.00 to 20.50
Old carwheels	15.50 to 16.00
No. 1 railroad wrought	20.00 to 21.00
Wrought-iron pipe	13.00 to 13.50
No. 1 forge fire	12.50 to 13.00
Bundled sheets	12.50 to 13.00
No. 2 busheling	10.50 to 11.00
Machine-shop turnings	8.00 to 8.50
Cast borings	9.00 to 9.50
No. 1 cast	16.00 to 16.50
Grate bars, railroad	11.75 to 12.25
Stove plate	11.75 to 12.25
Railroad malleable	13.50 to 14.00

Cleveland

CLEVELAND, OHIO, Aug. 22, 1916.

Iron Ore.—Some ore reservations have been made for 1917 and there is considerable additional inquiry, especially for non-Bessemer steel-making ore. This inquiry is for the most part for high grade ore. When business is booming in the steel industry many furnace interests try to secure the best ores in order to get the maximum production from their furnaces, and that policy is doubtless the reason for the present efforts to cover for next year's ore requirements thus early. An unusually early buying movement is expected by ore shippers, a number expressing the opinion that the bulk of next season's requirements will be covered in November. If conditions in the steel industry continue as they are at present, sellers will probably not try to hold off longer than that time. It is practically certain that ore interests will not agree to pay \$1 a ton for vessel tonnage for ore for next season. While ore prices will be advanced shippers will be unwilling to allow the vessel men all or nearly all of the increase. What the advance in ore prices will be is at present problematic, but in naming next season's prices the fact may be taken into consideration that this season's advance of 70 cents a ton over the low prices of 1915 was disappointing to some of the ore men who thought the advance should have been \$1. New Lake vessel capacity to come out late this season or early in 1917 will increase the Lake ore-carrying capacity next year about 2,500,000 tons, and that fact may make the vessel situation for the ore people somewhat easier than it is at the present time. We quote ore prices as follows, delivered lower Lake ports: Old range Bessemer, \$4.45; Mesaba Bessemer, \$4.20; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.55.

Pig Iron.—A fairly active buying movement is in progress in Northern foundry, basic and malleable iron, although sales are largely outside of this immediate territory. Considerable tonnage has been sold during the past few days, and a number of new inquiries are pending, particularly from the Pittsburgh district and from the East. Some of the foundry iron sales were for the fourth and first quarters and others for the first half. One Cleveland interest reports August sales amounting to 70,000 tons as compared with 9000 tons during July. Prices are unchanged. Foundry iron sales are being made at \$18, Cleveland, for No. 2, for outside shipment and at the same Valley furnace price by one interest for delivery through at least the first quarter, but other producers are asking higher prices and sales are reported at \$18.50, Valley furnace. Ella furnace of Pickands, Mather & Co., at West Middlesex, Pa., which has been out for relining, was blown in Aug. 17 on Bessemer iron. We quote, delivered Cleveland, as follows:

Bessemer	\$21.95
Basic	18.95
Northern No. 2 foundry	\$18.70 to 18.80
Southern No. 2 foundry	18.00 to 18.50
Gray forge	18.50
Jackson County silvery, 8 per cent	
silicon	28.62 to 30.62
Standard low phos., Valley furnace	32.00

Coke.—The market is quiet but very firm. Standard Connellsville foundry coke is quoted at \$3.15 to \$3.50 per net ton at oven for prompt shipment and \$3.25 to \$3.50 for contracts. Connellsville furnace coke for prompt shipment has brought \$2.65 to \$2.85.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have advanced prices about 5 per cent on bolts and have shortened the discounts on nuts by 20 cents. The demand is quite active for this season of the year. Rivet prices are unchanged at 4c., Pittsburgh, for structural and 4.10c. for boiler rivets. Bolt and nut discounts are as follows:

Common carriage bolts, $\frac{3}{4}$ x 16 in., smaller or shorter, rolled thread, 50 and 5; cut thread, 40, 10 and 2 $\frac{1}{2}$; larger or longer, 35 and 2 $\frac{1}{2}$; machine bolts within h. p. nuts, $\frac{3}{4}$ x 4 in., smaller and shorter, rolled thread, 50 and 10; cut thread, 50; larger and longer, 40 and 10; lag bolts, gimlet or cone point, 50 and 5; square h. p. nuts, blank or tapped, \$2.70 off the list; hexagon h. p. nuts, blank or tapped, \$2.70 off; c. p. c. and t. sq. nuts, blank or tapped, \$2.40; hexagon nuts, all sizes, \$2.80 off; cold pressed semi-finished hexagon nuts, all sizes, 60 and 5.

Finished Iron and Steel.—New inquiry is plentiful,

but consumers are having difficulty in finding mills in a position to take on additional orders for the deliveries wanted. Mills able to deliver are booking considerable business for early shipment and for fourth quarter. There is considerable inquiry for steel for the automobile trade for the first half, and this industry would cover for the entire year if mills would sell that far ahead. One shop making automobile forgings is in the market for 1000 tons of forging bars per month on a sliding scale basis. New local inquiries for shell steel aggregate about 18,000 tons, mostly for the fourth and first quarters. The demand for plates is very heavy and the market is firm, quotations ranging from 3c. to 4c., Pittsburgh, depending on the deliveries and sizes. Inquiry for sheets is very active and the market is firmer. One Ohio mill yesterday advanced prices \$2 a ton on all grades. Consumers are anxious to cover for their first half requirements, but most mills are taking only definite orders for delivery at their convenience. We quote black sheets at 2.90c. to 3c., Ohio mill, for No. 28; blue annealed sheets, 3c. to 3.50c., for No. 10, and galvanized 4.25c. to 4.45c. for No. 28. Iron bars are quoted at 2.45c. to 2.50c., Cleveland. Hard steel bars are irregular. While the general quotation is 2.50c. at mill, this price is being shaded about \$2 a ton. Warehouse prices are 3.25c. for steel bars and structural material, 3.65c. for plates and 3.20c. for iron bars.

Old Material.—Aside from the buying of a fair tonnage of heavy melting steel by a Canton mill the market is inactive. Mills generally are well supplied and two consumers, Corrigan, McKinney & Co. and the Brier Hill Steel Company, are holding up on shipments. Mills will not buy except at low prices, and dealers are forced to make concessions to move material on the track. However, there is a firm undertone in the market and many dealers are unwilling to sell at present prices, but are holding for an advance. Borings and turnings have declined and the large production of the latter keeps their price below that of borings. There is no demand for busheling scrap. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Steel rails	\$14.75 to \$15.00
Iron rails	18.50 to 19.00
Steel car axles	32.00 to 33.00
Heavy melting steel	15.00 to 15.50
Carwheels	12.75 to 13.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	12.50 to 12.75
Railroad malleable	14.00 to 14.25
Steel axle turnings	12.00 to 12.50
Light bundled sheet scrap	12.00 to 12.25
Per Net Ton	
Iron car axles	\$24.00 to \$25.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	5.25 to 5.50
No. 1 busheling	11.00 to 11.25
No. 1 railroad wrought (nominal)	15.00 to 15.50
No. 1 cast	13.00 to 13.50
Railroad grate bars	10.00 to 10.50
Stove plate	10.00 to 10.25

Buffalo

BUFFALO, N. Y., Aug. 22, 1916.

Pig Iron.—Buffalo furnace sales for the week have aggregated between 45,000 and 50,000 tons, principally foundry grades and malleable, with some basic and Bessemer, and the tonnage under negotiation will nearly equal this total. One furnace interest, which has booked quite a heavy aggregate tonnage in the past two weeks, announces that it intends to hold off on further quotations for about 60 days, feeling confident that higher prices will then prevail. Another interest reports that indications point to more or less of a scramble for iron in the next 60 days. It is reported that the General Electric Company has covered for its 1917 requirements. We quote as follows, f.o.b., furnace, Buffalo:

No. 1 foundry	\$19.00 to \$19.50
No. 2 X foundry	18.50 to 19.00
No. 2 plain	18.50 to 18.75
No. 3 foundry	18.50 to 18.75
Gray forge	18.25 to 18.50
Malleable	18.50 to 19.00
Basic	19.00 to 20.00
Bessemer	21.00 to 22.00
Charcoal, regular brands and analysis	21.00 to 22.00

Finished Iron and Steel.—Mills have again been hampered by the heat in the matter of output. One

interest reports that in the last few days it has been unable to turn out more than 50 per cent of its capacity. On the smaller sizes of shapes most interests are booked solid to the end of the second quarter of 1917. Consumers seeking to have orders booked are ready to buy subject to mills' convenience as to delivery. Cold rolled steel has shown signs of strengthening. Most sellers are quoting only 15 per cent off. The Monarch Engineering Company, Buffalo, for the 2,500,000-bu. grain elevator for the Central Elevator Company, is this week placing orders for 100 tons of plates for hopper work, 1200 tons of concrete reinforcing bars and 1200 tons of structural steel.

Old Material.—The market shows a strong undercurrent of strength, influenced by the prospective large demand for heavy melting steel, which, according to dealers, is due in the next six weeks. The heavy export demand for steel car axles has caused a further advance in price of that commodity. The increase of \$2 per ton is nominal, as this line of material is practically an absent quantity. While schedules hold generally to the list quoted last week, dealers are not disposed to sell other than small amounts at these figures. We quote dealers' asking prices, per gross ton, f.o.b., Buffalo, as follows:

Heavy melting steel	\$15.50 to \$16.00
Low phosphorus steel	20.00 to 20.50
No. 1 railroad wrought scrap	17.25 to 17.75
No. 1 railroad and machinery cast scrap	15.50 to 16.00
Steel axles	26.00 to 26.50
Iron axles	24.00 to 24.50
Carwheels	13.00 to 13.50
Railroad malleable	15.00 to 16.00
Machine shop turnings	6.00 to 6.50
Heavy axle turnings	12.00
Clean cast borings	7.50 to 7.75
Iron rails	18.00 to 18.50
Locomotive grate bars	11.50 to 12.00
Stove plate (net ton)	11.00 to 11.50
Wrought pipe	12.00 to 12.50
Bundled sheet scrap	11.50 to 12.00
No. 1 busheling	13.00 to 13.50
No. 2 busheling	11.00 to 11.50
Bundled tin scrap	15.00 to 15.50

Cincinnati

CINCINNATI, OHIO, Aug. 23, 1916.—(By Wire.)

Pig Iron.—A total of 128,000 tons of basic iron has been bought in this immediate territory since Aug. 1. Approximately 30,000 tons was booked by Southern producers, and the remainder will be shipped from Iron-ton and Columbus, Ohio. Deliveries extend through the first half of next year on a large part of this iron. It is rumored that further basic purchases are pending that will swell the total some 20,000 tons. Foundry iron has been more active in the past few days, but concessions in prices have been made by a number of furnaces in some recent contracts closed. Hanging Rock furnaces have taken some business at \$18, Iron-ton, and in the South \$13.50, Birmingham basis, for this year has been openly quoted for shipment into next year. The majority of Southern makers are holding out for \$14 to \$14.50, and these figures are generally understood to be satisfactory for iron to be shipped in the first half of next year. The inquiry for foundry iron is much improved. In southern Ohio two concerns want 500 tons each of Southern No. 2 for first quarter shipment. Central and northern Ohio foundries also furnish several requests for prices on both foundry and malleable, and to-day's report includes a sale of 1500 tons of malleable to a northern Ohio manufacturer. A southern Illinois consumer bought 1500 tons of Southern foundry for first half. A Michigan melter has purchased 2000 tons of Lake Superior charcoal iron for first half. Nearly all pig-iron salesmen are back on the road and are making many small sales for delivery into next year. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	\$16.90 to \$18.40
Southern coke, No. 2 f'dry and 2 soft	16.40 to 17.90
Southern coke, No. 3 foundry	15.90 to 17.40
Southern coke, No. 4 foundry	15.40 to 16.90
Southern gray forge	14.90 to 16.40
Ohio silvery, 8 per cent silicon	28.26 to 28.76
Southern Ohio coke, No. 1	20.26 to 20.76
Southern Ohio coke, No. 2	19.26 to 19.76
Southern Ohio coke, No. 3	18.76 to 19.26
Southern Ohio malleable Bessemer	19.26 to 19.76
Basic, Northern	19.26 to 19.76
Lake Superior charcoal	21.20 to 22.20
Standard Southern carwheel	24.90 to 25.40

(By Mail)

Coke.—Spot shipment foundry coke prices fluctuate almost daily. Buying is just as irregular as the available surplus supply to take care of prompt orders. Connellsville 72-hr. coke for prompt shipment ranges all the way from \$3 to \$3.50 per net ton at oven, with the average contract figure around \$3.25. Wise County and Pocahontas quotations on foundry grades are unchanged at \$3.25 to \$3.75, and New River approximately 50c. per ton higher. Except for domestic purposes, no recent furnace coke contracts have been reported. We quote Connellsville 48-hr. coke at \$2.50 at oven, but carload lots for prompt shipment have brought as high as \$2.90.

Finished Material.—The local warehouses report quite a brisk demand for steel bars, structural shapes and galvanized sheets. Orders are being filled promptly from stocks except in cases where mill shipments have been curtailed. This condition exists as far as twist drills are concerned and jobbers are complaining that they are not able to get a sufficient supply promptly to take care of some of their customers. The jobbers' price on wire nails has been advanced to \$2.85 per keg, base, and barb wire is quoted at \$3.65 per 100 lb. Although the mill prices of steel bars and small structural shapes have been advanced, local store quotations remain at 3.20c. Twisted steel bars are quoted at 3.35c. and plates at 3.50c. A marking up of all warehouse prices is predicted before the end of the present month. The demand on the warehouses is said to be more than double that in the corresponding period of July. Mill quotations on No. 28 galvanized sheets are unchanged and strong at 4.40c. to 4.50c., and on No. 28 black, 3.05c. to 3.10c., Cincinnati or Newport, Ky.

Old Material.—Reports that large tonnages of scrap have been lately taken by the rolling mills are unconfirmed. The difference in costs of basic pig iron and scrap is so great that consumers of the latter are using more than formerly. This applies also to the foundries. Prices have not changed, but both iron axles and locomotive tires are said to be firmer at the prices given. The following are dealers' prices to consumers, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton

Bundled sheet scrap	\$10.25 to \$10.75
Old iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	21.00 to 21.50
Rerolling steel rails	14.50 to 15.00
Heavy melting steel scrap	14.00 to 14.50
Steel rails for melting	13.00 to 13.50

Per Net Ton

No. 1 railroad wrought	\$13.50 to \$14.00
Cast borings	4.50 to 5.00
Steel turnings	4.75 to 5.25
Railroad cast scrap	11.00 to 11.50
No. 1 machinery cast scrap	12.75 to 13.25
Burnt scrap	8.25 to 8.75
Iron axles	23.00 to 24.00
Locomotive tires (smooth inside)	19.75 to 20.25
Pipes and flues	9.25 to 9.75
Malleable and steel scrap	10.75 to 11.25
Railroad tank and sheet scrap	8.25 to 8.75

Birmingham

BIRMINGHAM, ALA., Aug. 21, 1916.

Coal and Coke.—Bunker demand for coal at New Orleans has improved and steam coal prices are stiffer. Warrior River movements to the gulf are increasing. Alabama mines are finding a larger outlet, owing to improved business in States to the north. Standard beehive coke is selling at \$4.25 to \$4.50 per net ton at oven and furnace coke at \$3.25 to \$3.50, with every feature of the market strong.

Pig Iron.—The first real selling that has taken place in this market for weeks occurred around Aug. 18, when one furnace interest is stated to have sold in one day 8000 to 10,000 tons on the basis of \$14.50 for spot and \$15 for the remainder of the year. The same interest also disposed of some high manganese iron at \$16.50. The Tennessee Company will not figure greatly in the foundry market this autumn in all probability. A stack at Bessemer, Ala., is soon to go off basic and commence making ferromanganese from Brazilian and Georgia ores. Another Bessemer foundry stack will go out for relining. The heavy demand for shell steel will require an immense amount of basic iron. The

leading interest and the majority of other furnace operators report the regular sale of small lots at \$15 for the remainder of the year. However, it remains that the only interest reporting large sales quotes spot at \$14.50. Confidence has returned in a remarkable degree, considering the small business done. Car shortage is affecting the movement of iron. Shops making heavy castings were never busier. One has just secured an order from our Government for cast-iron shells for target practice after having completed an order for \$200,000 worth of lathes for the British Government. Skilled labor has become scarce, owing to superior inducements offered by munitions factories, and conditions are very uneven in this respect. The Bessemer rolling mill of the Tennessee Company will have completed certain enlargements by Sept. 1. The Birmingham Commercial Club and the Tennessee Company are in correspondence with regard to prices charged in Birmingham for steel products of the Bessemer mill. In a general way the prices charged at that mill are Pittsburgh prices with one-third of the freight rate from Pittsburgh to Birmingham added. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft.....	\$15.00 to \$15.50
No. 2 foundry and soft.....	14.50 to 15.00
No. 3 foundry.....	14.00 to 14.50
No. 4 foundry.....	13.75 to 14.25
Gray forge.....	13.50 to 14.00
Basic.....	14.50 to 15.00
Charcoal.....	22.00 to 22.50

Cast-Iron Pipe.—While orders for water pipe have not increased, the tone of the market is much better. There are indications that some very good contracts will be offered in the near future. Soil pipe remains quiet. The rush of shipments to the Pacific coast, incident to the raise in rates effective Sept. 1, has been considerable. The raise is to be from \$11 to \$17.60 per ton, the Spokane rate. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$28; 6-in. and upward, \$25, with \$1 added for gas pipe and 16-ft. lengths.

Old Material.—Owing to the continued large production of steel scrap at mills producing shrapnel shapes, and to other causes tending to make old material a bargain counter proposition, the market has not improved. Sales at low figures have been made. The export demand for axles at high prices is interesting the dealers, but very few have been able to secure sufficient to make shipments. The result is that axles frequently go in mixed steel scrap. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old steel axles.....	\$24.00 to \$30.00
Old steel rails.....	10.00 to 10.50
No. 1 steel scrap.....	9.25 to 9.75
No. 1 wrought scrap.....	12.50 to 13.00
No. 1 cast scrap.....	10.50 to 11.00
Extra heavy cast scrap.....	9.50 to 10.00
Stove plate and light.....	9.00 to 9.50
Old carwheels.....	9.50 to 10.00
Tram carwheels.....	9.50 to 10.00

St. Louis

ST. LOUIS, Mo., Aug. 21, 1916.

Pig Iron.—Exceptionally heavy buying by the larger interests has convinced the smaller melters that a lower market is not likely. In consequence inquiries are appearing of 1500 tons and downward, aggregating probably 15,000 tons. Sales of the week aggregated about 50,000 tons, taken by three of the largest consumers of basic, of which about 35,000 tons was Northern and 15,000 tons Southern, deliveries to be through the first half of next year.

Coke.—No sales of importance were made in either bee-hive or by-product and no inquiries of consequence have appeared.

Finished Iron and Steel.—Consumers of structural material are evincing a disposition to enter the market, though for the moment they are deterred by the extended deliveries. A sale of 500 tons of 90-lb. steel rails was made for delivery a year hence. Announcement of a 14-story building requiring 6000 to 7000 tons of structural material, with construction to begin within 30 days, is leading to some speculation as to where the material is to come from. Movement out of

warehouse continues active with prices held firmly. We quote for stock out of warehouse as follows: Soft steel bars, 3.15c.; iron bars, 3.05c. to 3.10c.; structural material, 3.15c.; tank plates, 3.55c.; No. 10 blue annealed sheets, 3.45c.; No. 28 black sheets, cold rolled, one pass, 3.30c.; No. 28 galvanized sheets, black sheet gage, 4.80c. to 5c.

Old Material.—Scrap has shown a much better tone and both steel foundry and rolling mill grades are decidedly firmer, though consumers have not yet actively entered the market. Most of the transactions have been among the dealers. We quote dealers' prices, f.o.b., customers' works, St. Louis industrial district, as follows:

	Per Gross Ton
Old iron rails.....	\$16.25 to \$16.75
Old steel rails, rerolling.....	15.00 to 15.50
Old steel rails, less than 3 ft.....	15.00 to 15.50
Relaying rails, standard section, subject to inspection.....	23.00 to 24.00
Old carwheels.....	11.50 to 12.00
No. 1 railroad heavy melting steel scrap.....	14.50 to 15.00
Heavy shoveling steel.....	13.50 to 14.00
Frogs, switches and guards cut apart.....	14.50 to 15.00
Bundled sheet scrap.....	8.00 to 8.50

	Per Net Ton
Iron angle bars.....	\$16.00 to \$16.50
Steel angle bars.....	13.50 to 14.00
Iron car axles.....	24.50 to 25.00
Steel car axles.....	27.00 to 27.50
Wrought arch bars and transoms.....	19.50 to 20.00
No. 1 railroad wrought.....	14.50 to 15.00
No. 2 railroad wrought.....	14.25 to 14.50
Railroad springs.....	14.00 to 14.50
Steel couplers and knuckles.....	14.00 to 14.50
Locomotive tires, 42 in. and over, smooth inside.....	19.50 to 20.00
No. 1 dealers' forge.....	10.25 to 10.75
Cast-iron borings.....	6.50 to 7.00
No. 1 busheling.....	12.50 to 13.00
No. 1 boilers, cut to sheets and rings.....	9.50 to 10.00
No. 1 railroad cast scrap.....	11.00 to 11.50
Stove plate and light cast scrap.....	8.75 to 9.25
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	10.50 to 11.00
Railroad sheet and tank scrap.....	9.75 to 10.25
Railroad grate bars.....	9.50 to 10.00
Machine-shop turnings.....	7.00 to 7.50

New York

NEW YORK, Aug. 23, 1916.

Pig Iron.—The greater activity noticed last week in the pig iron market continues. Buying is by no means general, but a number of important companies have been in the market and the position of sellers is generally firmer. In a number of cases advances have been made, though as a matter of fact a good deal of the business thus far closed has been at the low prices recently prevailing. The General Electric Company has bought for its Eastern plants, the total being 13,000 tons to 14,000 tons, and largely Southern iron. The malleable inquiry from Connecticut referred to a week ago is still before the market. There is another Connecticut inquiry for 2000 to 3000 tons. A New Jersey foundry has asked for 5000 tons for delivery in the first half of 1917. This may already be closed. For a Southern railroad supply interest the purchases for the last quarter of this year and the first quarter of 1917 have amounted to 3200 tons of coke iron and 550 tons of charcoal iron. The International Steam Pump Company's schedule, which involved about 35,000 tons for 1917, is still unfilled, though some nearby delivery iron has been taken. In this case some bids both on Northern and Southern iron have been withdrawn, due to advances of 50c. by certain furnaces which bid. Of the 11,000 tons of basic iron wanted at Newark, about half was placed with an eastern Pennsylvania producer and the remainder is about to be closed. Southern iron has strengthened and warrant iron could hardly be had below \$13.50 now, while furnaces quote \$14 at furnace as minimum for No. 2. Buyers are finding difficulty in having duplicated some of the quotations made them in the past two or three weeks. For example, several thousand tons of No. 3 iron was offered at \$18.50, delivered in New Jersey. There is a 10,000-ton inquiry for special Bessemer iron for export, silicon being from 1 to 2 per cent and phosphorus and sulphur limits 0.05 per cent. A sale of 1000 tons of Southern foundry iron for export was made in this market and one of 500 tons of Bessemer

iron. A South American inquiry involves 500 tons of foundry iron. We quote at tidewater for early delivery: No. 1 foundry, \$20 to \$20.50; No. 2 X, \$19.50 to \$20; No. 2 plain, \$19.25 to \$19.50; Southern iron at tidewater, \$19.50 to \$20 for No. 1 and \$18.75 to \$19.25 for No. 2 foundry and No. 2 soft.

Ferroalloys.—Some concern is felt in the market over the report that several British producers have thus far been unable to secure August licenses to ship ferromanganese. This is taken to mean a possible restriction of shipments which have recently been only enough to satisfy demands on contract. It is believed by some brokers here that some important move is in the air. Specifications on contract are heavy and indications are that some consumers are sailing close to the wind on supplies. New inquiry is not active and sales are very few. The market is a little firmer and it is believed that \$175, seaboard, is the best that can be done now for any delivery. Spiegeleisen is quiet at \$45 to \$50, furnace. Ferrosilicon, 50 per cent, is very active and scarce, with specifications on contract very brisk. The last quotation was \$86 to \$88, Pittsburgh, on contract, with \$90 and upwards for nearby delivery.

Finished Iron and Steel.—The Allies have not yet secured all the steel they desire for next year's campaign, and they are seeking to have makers quote any quantities and deliveries they can make up to the end of the first half. In a number of cases mills have been approached more than once. Meanwhile the domestic buyer, believing that there is no danger of immediate runaway prices, limits his purchases to his needs, thus minimizing his engagement of capital. Jobbers covered about the first of the month for their fourth quarter requirements, securing about their normal quantities, which, indeed, was all the mills cared to bind themselves for. New structural work appears to consist chiefly of plant additions, but few individually large jobs are being placed. In about a month a buying movement is expected in general building lines, and at the moment some recently pending jobs are quite active; and shortly following this it is expected that the railroads, having strike difficulties behind them, will come in rather heavily for bridge work. The buyer is getting used to figuring in terms of present prices, so that those of 15 and 18 months ago seem to be of the distant past. Railroad car buying cannot yet be considered promising and, as has been the case in late weeks, the car builders get chiefly car repairs and repair parts. Buying for shipbuilding has not been notable in this locality. Numerous inquiries still appear to be unsatisfied. A sale of 600 tons to Japan is noted, half at 4c., Pennsylvania mill, and for the last two months of this year, and half at 3c., Pittsburgh basis, for the early months of next year. Among the week's structural awards, the McClintic-Marshall Company is prominent, securing 1600 tons for the Southern Railway, leaving 5300 tons to be bought by this road at some later time, and 1700 tons for subway work in Fifty-ninth Street and the East River. Other bridge work includes 500 tons for the Piedmont & Northern, placed probably with the Virginia Bridge & Iron Works; 130 tons for three bridges for the Boston & Maine to the Phoenix Bridge Company; 250 tons for the Baltimore & Ohio at Defiance, Ohio, to the American Bridge Company, and 180 tons to the Boston & Maine divided between the Pennsylvania Steel Company and the Boston Bridge Works. The Pennsylvania Railroad has fresh inquiries for 300 tons of bridge work following recent awards for about 1000 tons. In building work, the Hinkle Iron Company has taken two Herzog apartments, 600 tons each, recently mentioned in this column; the Eastern Bridge & Structural Company, Worcester, Mass., has 280 tons for Y. W. C. A., Troy, N. Y.; the Hay Foundry & Iron Works, 300 tons for the Boys' Club, Tenth Street and Avenue A; the Lackawanna Bridge Company, 400 tons for the American Gas Company at Waterloo, Iowa, and the American Bridge Company, 300 tons for a locomotive shop for the Boston & Maine at East Deerfield, Mass., and 300 tons for the Williamsport Wire Rope Company. The International Steam Pump Company is in the market for a 300-ton structure at Holyoke, Mass. In railroad cars, the Western Pacific is asking prices on 1200 cars and

the Indianapolis & St. Louis is expected to buy 1000 box cars. The general character of the car business is indicated by an inquiry for 1900 center constructions for the Kansas City Southern, and by contracts of the Atlantic Coast Line with the Pressed Steel Car Company for 100 underframes and of the Michigan Central with the same company for 500 center constructions and of the Illinois Central with the American Car & Foundry Company for steel repairs to 1000 cars. The stronger situation regarding prices is indicated in a new minimum of 3.019c., New York, for deliveries from one company in, say, 60 days, while 2.669c. is the best price on deliveries in 90 days; wide and sheared plates take 4.419c. to 4.669c., New York, in small lots, with 4.169c. as minimum on attractive lots for delivery this year; the minimum for sheared and the narrower plates appears to be 3.169c., New York, with some mills holding for 3.669c. for this year's delivery; steel bars are quoted at 2.769c., New York, with the Bessemer product obtained earlier than the open hearth, and bar iron continues at 2.669c., New York. Out of warehouse, steel and iron bars and shapes take 3.25c., New York, and plates 4 to 4.25c. Movement out of warehouse is again quite active.

Cast-Iron Pipe.—Public lettings are few and small, but the demand from private buyers continues to hold up satisfactorily. Pipe founders are carefully watching the pig-iron market, as any advance in pig iron will probably make it necessary to mark up the price of pipe. Carload lots of 6-in., class B and heavier, are firm at \$30.50 per net ton, tidewater, class A and gas pipe taking an extra of \$1 per ton.

Old Material.—A better demand has come from the iron rolling mills of eastern Pennsylvania. Some good quantities of No. 1 railroad wrought and wrought pipe have been bought, and prices on these commodities have stiffened. The demand, however, has not extended to all classes of rolling-mill stock, while the steel companies of both eastern Pennsylvania and the Pittsburgh district have done practically nothing in this market. Embargoes at steel works are still interfering with deliveries on contracts. Brokers purchasing for the Pittsburgh market quote \$13 to \$13.25, New York, for heavy melting steel scrap. Buying prices for the Eastern trade are quoted about as follows, by brokers to local dealers and producers, per gross ton, New York:

Heavy melting steel scrap (eastern Pennsylvania specifications).....	\$11.75 to \$12.00
Old steel rails (short lengths) or or equivalent	12.50 to 12.75
Relaying rails	27.50 to 28.00
Rolling rails	16.50 to 16.75
Rolling rails (for export)	19.00 to 20.00
Iron car axles	29.00 to 30.00
Steel car axles (for export)	35.00 to 36.00
No. 1 railroad wrought	18.00 to 18.50
Wrought-iron track scrap	15.50 to 16.00
No. 1 yard wrought, long	13.50 to 14.00
No. 1 yard wrought, short	11.75 to 12.00
Light iron (nominal)	3.50 to 4.00
Cast borings (clean)	6.75 to 7.25
Machine shop turnings (nominal)	4.25 to 4.50
Mixed borings and turnings	4.25 to 4.50
Wrought pipe	10.75 to 11.25
Old carwheels (nominal)	15.00 to 15.50
Malleable cast (railroad)	12.00 to 12.50

Foundries continue to purchase but sparingly. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery)	\$16.00 to \$16.50
No. 2 cast (heavy)	14.50 to 15.00
Stove plate	11.00 to 11.25
Locomotive grate bars	10.00 to 10.25

The Hoffman Heater Company, Lorain, Ohio, has acquired the sales organization of the Beeler Water Heater Company, Pittsburgh, as an expansion of its business. An increase in capital stock from \$100,000 to \$300,000 has been authorized. W. J. Langenheim, formerly president of the Beeler Water Heater Company, will be sales manager; John Ellis will succeed Fred Oehlke as superintendent and engineer, and F. J. Zinkle will be purchasing agent. The officers of the Hoffman Heater Company are as follows: A. H. Babcock, president; S. A. Ault, vice-president and manager, and J. M. Jones, secretary-treasurer.

British Steel Market

All Sheet and Plate Exports Prohibited—Record Quotation for American Billets

LONDON, ENGLAND, Aug. 23, 1916.—(By Cable.)

Pig iron is in strong demand, with new business in hematite iron difficult. There is more inquiry for American billets with an increasing scarcity and bids ranging from £13 to £15 have been made for 4-in. billets for last quarter delivery.

Exports have been prohibited of tin plates, terne plates and all iron and steel sheets and plates. Tin plates are disorganized except for merchant business, which is subject to permits, with quotations about 32s. to 35s., though Government orders have been booked at 30s. Quotations are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 32s. to 35s., against 31s. a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £20 5s., against £20 a week ago.

Steel ship plates, Scotch, delivered local yards, £13 17s. 6d.

Steel rails, export, f.o.b. works, £10 17s. 6d.

Hematite pig iron, f.o.b. Tees, about 140s.

Sheet bars (Welsh) delivered at works in Swansea Valley, £10 7s. 6d.

Steel bars, export, f.o.b. Clyde, £18.

Ferromanganese (nominal), £35.

Ferrosilicon, 50 per cent, c.i.f., £29.

Greatest World Petroleum Output

That 1915 was the most successful year of production in the history of the petroleum industry is shown by statistics just compiled under the supervision of J. D. Northrop, of the U. S. Geological Survey. The total quantity of crude petroleum entering the world's markets in 1915, which amounted to 426,892,673 barrels, exceeds the former record, established in 1914, by 28,194,307 barrels, or 7 per cent. The bulk of the increase came from the United States and Mexico, though Russia, Argentina, and Japan recorded significant gains. The distribution of this production is shown in the following table:

	Barrels of 42 Gal.	Metric Tons	Per Cent of Total
United States	*281,104,104	37,480,547	65.85
Russia	68,548,062	9,353,077	16.06
Mexico	32,910,508	4,388,068	7.71
Dutch East Indies	12,386,808	1,710,445	2.90
Roumania	12,029,913	1,673,145	2.82
India	17,400,000	986,667	1.73
Galicia	4,158,899	578,388	.98
Japan and Formosa	3,118,464	415,785	.73
Peru	2,487,251	331,633	.58
Germany	995,764	140,000	.23
Trinidad	1750,000	100,000	.18
Argentina	516,120	75,900	.12
Egypt	221,768	29,569	.05
Canada	215,464	28,729	.05
Italy	39,548	15,500	.01
Other	110,000	1,333	.01
Total	426,892,673	57,298,786	100.00

*Marketed production. †Includes British Borneo. ‡Estimated.

German Steel Shipments and Prices

June shipments of the German Steel Works Union were 298,753 metric tons, as against 311,620 tons in May. This brings the average shipments for the first half of 1916 to 293,471 tons per month; in 1915 the average was 270,510 tons per month. The June shipments were made up of 77,483 tons of semi-finished steel, 134,584 of railroad material, and 86,686 tons of shapes.

For the fiscal year ended with June, 1916, the total shipments are reported as 3,280,838 tons, against 3,393,537 tons for the year ended June 30, 1915. At the end of the same fiscal year of 1913 the total shipments were 6,124,310 tons. The total allotment for the year was 6,459,313 tons, making this year's deliveries 50.6 per cent of the allotments. The decline in the last fiscal year is attributed to decrease in railroad material and shapes which enter normally so largely into export trade.

In the last year, shapes advanced from 130 marks for the first three-quarters of the year to 140 marks

for the last quarter. In 1914-15, the price was 110 marks for the corresponding period and 120 marks for the last quarter. Billets advanced from 107.50 marks at the beginning of the fiscal year of 1915-16 to 122.50 marks at the close; blooms from 107.50 marks to 112.50 marks; sheet bars from 117.50 marks to 127.50 marks; and ingots from 102.50 to 107.50 marks. Since this report prices have been further advanced by 20 marks for both semi-finished steel and shapes.

Iron and Industrial Stocks

NEW YORK, Aug. 23, 1916.

The stock market has permitted the railroad controversy to exert very little influence, notwithstanding the fact that the greatest strike ever known may at any day be precipitated upon the country. Under the leadership of United States Steel common, which has established a new high record, much above its previous high point of 94½ in 1909, all stocks have been much more active and at higher prices. The way in which they have advanced naturally suggests that the great financial interests of the country do not seriously expect a break between the railroad managers and their men. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	227½-261½	Republic, com.	48½-54½
Allis-Chal., pref.	79½-80½	Republic, pref.	112½-113½
Am. Can., com.	57½-61½	Sloss, com.	46-50½
Am. Can., pref.	110-111½	Sloss, pref.	95½
Am. Car & Fdy., com.	60½-65	Pipe, com.	21-22½
Am. Car & Fdy., pref.	117	Pipe, pref.	53-53½
Am. Loco., com.	71½-79½	U. S. Steel, com.	89½-97½
Am. Loco., pref.	104-106	U. S. Steel, pref.	117½-118
Am. Steel Fdries.	54-57	Va. I. C. & Coke.	47-48
Bald. Loco., com.	75½-82½	Westing. Elec.	59½-61½
Bald. Loco., pref.	105	Am. Rad., com.	390-392
Beth. Steel, com.	460-480	Am. Rad., pref.	132-134
Case (J. I.), pref.	84	Am. Ship, com.	48½-50
Colo. Fuel, com.	45-51½	Am. Ship, pref.	98
Deere & Co., pref.	90-91	Chic. Pneu. Tool.	67½-69
Gen. Electric, com.	169½-172	Cambria Steel	82
Gt. No. Ore Cert.	36½-41	Lake Sup. Corp.	10½-11½
Int. Harv. of N. J., com.	114-116	Cruc. Steel, com.	71½-79
Int. Harv. of N. J., pref.	119	Cruc. Steel, pref.	116½-118
Int. Harv. Corp., com.	78½-79	Harb.-Walk. Refrac.	101-104
Lacka. Steel, com.	72½-78½	La Belle Iron, com.	54-60
Nat. En. & Stm., com.	23-24½	La Belle Iron, pref.	131½-133
N. Y. Air Brake, com.	136½-140	Can. Car & Fdy., com.	50-52
Pitts. Steel, pref.	99-101	Can. Car & Fdy., pref.	70-77
Pressed Stl., com.	51½-55½	Central Fdry., com.	8
Pressed Stl., pref.	98½-100	Driggs-Seabury	94-99
Ry. Steel Spring, com.	46½-50½	Midvale Steel, com.	62-64½
Ry. Steel Spring, pref.	39½-100½		

Dividends

The Gulf States Steel Company, quarterly, 1½ per cent on the second preferred stock, payable Nov. 1. This statement should have appeared last week instead of the erroneous announcement that a dividend had been declared on the common stock.

The New York Air Brake Company, regular quarterly, 2½ per cent, payable Sept. 22. This is an increase of ½ of 1 per cent over the last dividend declaration.

The Republic Iron & Steel Company, regular quarterly, 1½ per cent on the preferred stock, and extra 4 per cent on account of accumulated dividends on the same issue, both payable Oct. 2. This payment of back dividends reduces the amount yet to be paid to 4 per cent.

The Crucible Steel Company of America, regular quarterly, 1½ per cent on the preferred stock, and extra 1½ per cent on account of accumulated dividends on the same issue, both payable Sept. 30. This payment of back dividends will reduce the amount yet to be paid to 23¼ per cent.

Fairbanks, Morse & Co., Inc., regular quarterly, 1½ per cent on the preferred stock, payable Sept. 1.

In a campaign which the Hyatt Roller Bearing Company, Newark, N. J., is inaugurating to emphasize the importance of anti-friction bearings in industrial use, the company has decided to call its commercial sales division the Industrial Department. This will be located at Newark. The underlying idea is that the time is coming fast when throughout the industrial world the advantage of anti-friction equipment will be accepted just as it has been by the automobile builder. This covers bearings for line shafts, industrial trucks, mine cars, machine tools, electric motors, cranes and trolleys, blowers and fans and conveyors.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, effective from April 10, 1916, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c.; Pacific coast (by rail only), 65c.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and tees 3 in. and over, 2.60c. to 2.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .30
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Plates.—Tank plates, ¼ in. thick, 6 in. up to 100 in. wide, 3c. to 4c., base, net cash, 30 days, or ½ of 1 per cent discount in 10 days, carload lots. Extras are:

Quality Extras	Cents per lb.
Tank steel	Base
Pressing steel (not flange steel for boilers)	.10
Boiler and flange steel plates	.15
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Locomotive firebox steel	.50
Marine steel, special extras and prices on application.	

Gage Extras	Cents per lb.
Rectangular, ¼ in. thick, over 6 in. wide to 100 in. wide.	Base
Lighter than ¼ in., up to 3/16 in., up to 72 in. wide.	.10
*Lighter than ¼ in., including 3/16 in., over 72 in. to 84 in.	.20
*Lighter than ¼ in., including 3/16 in., over 84 in. to 96 in.	.30
*Lighter than ¼ in., including 3/16 in., over 96 in. to 100 in.	.40
*Lighter than ¼ in., including 3/16 in., over 100 in. to 102 in.	.45
Lighter than 3/16 in., including No. 8, up to 72 in. wide.	.15
*Lighter than 3/16 in., including No. 8, over 72 in. to 84 in.	.25
*Lighter than 3/16 in., including No. 8, over 84 in. to 96 in.	.35
Lighter than No. 8, including No. 10, up to 60 in. wide.	.30
Lighter than No. 8, including No. 10, over 60 in. to 64 in.	.35
Up to 72 in. not less than 10.2 lb. per sq. ft. will be considered ¼ in.	
Over 72 in. must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.	
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of 3/16 in., take price of 3/16 in.	
Over 72 in., ordered weight 3/16 in., take No. 8 price.	
Over 72 in., ordered weight No. 8, take No. 10 price.	

Width Extras	Cents per lb.
Over 100 in. to 110 in. inclusive.	.05
Over 110 in. to 115 in. inclusive.	.10
Over 115 in. to 120 in. inclusive.	.15
Over 120 in. to 125 in. inclusive.	.25
Over 125 in. to 130 in. inclusive.	.50
Over 130 in.	1.00

Length Extras	Cents per lb.
Universal plates 80 ft. long up to 90 ft. long.	.05
Universal plates 90 ft. long up to 100 ft. long.	.10
Universal plates 100 ft. long up to 110 ft. long.	.20

Cutting Extras	Cents per lb.
No charge for rectangular plates to lengths 3 ft. and over	
Lengths under 3 ft. to 2 ft. inclusive.	.25
Lengths under 2 ft. to 1 ft. inclusive.	.50
Lengths under 1 ft.	1.55
Circles 3 ft. in diameter to 100 in.	.30
Circles over 100 to 110 in. (width extra)	.35
Circles over 110 to 115 in. (width extra)	.40
Circles over 115 to 120 in. (width extra)	.45
Circles over 120 to 125 in. (width extra)	.55
Circles over 125 to 130 in. (width extra)	.80
Circles over 130 in. (width extra)	1.30
Circles under 3 ft. to 2 ft. inclusive.	.55
Circles under 2 ft. to 1 ft. inclusive.	.80
Circles under 1 ft.	1.85
Half circles take circle extras.	
Sketches, not over four straight cuts, inc. straight taper	.10
Sketches having more than four straight cuts.	.20
Plates sheared to a radius take complete circle extras.	

*Including extra for width.

Wire Rods.—Including chain rods, \$55 to \$60.

Wire Products.—Prices to jobbers effective Aug. 5: Fence wire, Nos. 6 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, \$2.55; galvanized, \$3.25. Galvanized barb wire and staples, \$3.45; painted, \$2.75. Wire nails, \$2.60. Galvanized nails, 1 in. and longer, \$2 advance over base price; shorter than 1 in., \$2.50 advance over base price. Cement-coated nails, \$2.50. Woven wire fencing, 61½ per cent off list for carloads, 60½ off for 1000-rod lots, 59½ off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Nos.	6 to 9	10	11	12	12½	13	14	15	16
Annealed	\$2.60	\$2.65	\$2.70	\$2.75	\$2.85	\$2.95	\$3.05	\$3.15	\$3.25
Galvanized	3.30	3.35	3.40	3.45	3.55	3.65	3.75	3.85	3.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect on black pipe from April 21, 1916, and on galvanized pipe from July 24, 1916, all full weight:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1½, 2 and 3	63	55½	1½ and 2	52	44
3½ to 3	70	55½	2½	53	45
			3½ to 1½	57	48
				60	42
2	65	50½	1½	48	31
2½ to 6	68	53½	1½	54	38
7 to 12	65	49½	2	55	39
13 and 14	63½	..	2½ to 4	57	42
15	51	..	4½ to 6	57	42
			7 to 12	56	41

Reamed and Drifted		
Inches	Black	Galv.
1 to 3, butt.	68	53½
2, lap	63	48½
2½ to 6, lap	66	51½
1½	59	40½
2½ to 1½	68	54½
3 to 3	69	55½
2	63	49½
2½ to 4	66	52½
4½ to 6	65	51½
7 to 8	61	45½
9 to 12	56	40½

Butt Weld, extra strong, plain ends		
Inches	Black	Galv.
1½, 2 and 3	59	40½
3½ to 1½	68	54½
3 to 3	69	55½
2	63	49½
2½ to 4	66	52½
4½ to 6	65	51½
7 to 8	61	45½
9 to 12	56	40½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

Blue Annealed Sheets	
Nos.	Cents per lb.
Nos. 3 to 8	2.95 to 3.20
Nos. 9 and 10	3.00 to 3.25
Nos. 11 and 12	3.05 to 3.30
Nos. 13 and 14	3.10 to 3.35
Nos. 15 and 16	3.20 to 3.45

Box Annealed Sheets, Cold Rolled	
Nos.	Cents per lb.
Nos. 17 to 21	2.70 to 2.85
Nos. 22 and 24	2.75 to 2.90
Nos. 25 and 26	2.80 to 2.95
No. 27	2.85 to 3.00
No. 28	2.90 to 3.05
No. 29	2.95 to 3.10
No. 30	3.15 to 3.30

Galvanized Sheets of Black Sheet Gage	
Nos.	Cents per lb.
Nos. 10 and 11	3.15 to 3.25
No. 12	3.25 to 3.35
Nos. 13 and 14	3.25 to 3.35
Nos. 15 and 16	3.35 to 3.45
Nos. 17 to 21	3.50 to 3.60
Nos. 22 and 24	3.60 to 3.70
Nos. 25 and 26	3.75 to 3.85
No. 27	4.00 to 4.10
No. 28	4.15 to 4.25
No. 29	4.30 to 4.40

Boiler Tubes.—Discounts on less than carloads, freight to destination added, effective from April 15, 1916, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
Inches	Cents per lb.	Inches	Cents per lb.
1½	35	1½	27
1½ and 2 in.	47	1½ and 2 in.	29
2½	44	2½	36
2½ and 3 in.	50	2½ and 3 in.	42
3 and 3½ in.	55	3 and 3½ in.	48
3½ to 4½ in.	56	3½ to 4½ in.	41
5 and 6 in.	49	5 and 6 in.	41
7 to 13 in.	46	7 to 13 in.	38

Locomotive and steamship special charcoal grades bring higher prices.

1½ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin,	Lead		Spelter		
	Electro-lytic	New York	New York	St. Louis	New York	St. Louis	
Aug. 16	26.75	26.50	38.75	6.05	5.90	9.25	9.00
17	26.27	26.50	38.75	6.25	6.15	9.40	9.15
18	27.00	26.75	38.50	6.50	6.35	9.50	9.25
19	27.00	26.75	6.55	6.40	9.50	9.25
21	27.25	26.87½	38.50	6.62½	6.50	9.60	9.35
22	27.25	26.87½	38.50	6.62½	6.50	9.75	9.50

NEW YORK, Aug. 23, 1916.

Copper is higher because of large buying. Tin is quiet but steady. Lead has advanced on active buying. Spelter is quiet and steady after an active market. Antimony has risen.

New York

Copper.—Prices have again advanced, and a large amount of buying has been reported. At present, demand has slackened, and the market is quiet but steady. Consumers have evidently covered their present needs pretty extensively, but prices are still strong. The buying has been for both foreign and domestic account, and considerable of it has been for delivery this year, though there has been some inquiry and possibly sales for early 1917 delivery. It is estimated that fully 25,000,000 lb. were sold during the week, and it is reported that the pending order for the Allies of 125,000 tons has also been arranged for. The market is really a sellers' one, and they are inclined to make no concessions. The London market yesterday was £127, against £126 a week ago. Exports this month, including yesterday, were 22,544 tons. Spot and August electrolytic were quoted yesterday at 26.87½c. cash, New York, with spot copper very scarce. Lake copper is higher, but nominal at 27.25c. cash.

Tin.—The market is quiet, and there seems to be no anxiety to buy or sell. Some business has been done to protect contracts and to cover short sales, but the quantity has not been large. On the whole, the week has been quiet, a feature being that prices have held well, with no indications of ease anywhere. Yesterday, Straits tin was quoted at 38.50c., New York, with Banca obtainable at 37.50c. The arrivals this month total 3137 tons, with 3110 tons reported afloat.

Lead.—A heavy demand was prevalent all of last week, with probable sales running as high as 10,000 tons. Buying came from all directions, and it was for both foreign and domestic consumption. The demand seemed to be especially for prompt and August delivery, caused probably by the fact that buyers' stocks had run low, so that they could not hold off any longer. The demand was finally of such proportions that the outside price was advanced above that of the leading interest, which at once raised its quotations on Thursday to 6.25c. The demand continuing, another advance was made on Friday to 6.50c. Sellers are evidently well sold up, and it is estimated that there is not much lead left for shipment within a month. In the present week the market has been quieter, with sellers apparently not willing to sell, or perhaps buyers disinclined to come into the market. A small tonnage was reported sold as high as 6.55c., St. Louis, with a smaller quantity changing hands at 6.65c. Special conditions probably attended the latter transaction. One report insists that the leading interest is now out of the market for early delivery. The New York quotation yesterday was 6.62½c., with St. Louis at 6.50c. Exports this month, including yesterday, have been 768 tons, against 758 tons a week ago.

Spelter.—Prompt spelter is now quoted at 9.75c., New York, and 9.50c., St. Louis, the market having advanced rather steadily all the week. There has been heavy buying reported both for foreign and domestic account, but just now the demand seems to have slackened and the market is quiet. There is evidently less metal in second hands and producers are sold up better than when the last advance was on. Quotations for the

balance of the year are about ¼c. per month below the present spot quotation. Large quantities of high grade spelter, which for so long was in poor demand, have been sold the past week. It is announced that Great Britain has entered into an agreement with Australia under which about 100,000 tons of zinc concentrates and 45,000 tons of spelter are to be taken yearly for the period of the war and 10 years thereafter. Exports to Aug. 22 inclusive have been 6990 tons.

Antimony.—As forecasted last week, the market has advanced and the quotation yesterday was 13.50c., duty paid. Sales have been large, some estimates placing them from 500 to 1000 tons. Demand continues good for prompt and September delivery.

Aluminum.—The market is dull and quiet, with No. 1 virgin metal, 98 to 99 per cent pure, quoted at 58c. to 60c. Sheets for delivery in five or six weeks are held at 80c. to 85c., delivered.

Old Metals.—The market is much more active. Old copper, brass and lead are higher. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	24.00 to 24.75
Copper, heavy and wire	23.00 to 23.75
Copper, light and bottoms	19.50 to 20.00
Brass, heavy	14.00 to 14.50
Brass, light	11.00 to 12.00
Heavy machine composition	18.25 to 18.75
No. 1 yellow rod brass turnings	14.25 to 15.00
No. 1 red brass or composition turnings	15.00 to 16.00
Lead, heavy	5.75
Lead, tea	5.25
Zinc	6.50 to 7.50

Chicago

AUG. 21.—The continuance of domestic demand for copper has made for a strong market, with prices high, though subject to some variation. Lead and spelter are likewise firmer, but the tin market is quite dull. We quote: Casting copper 25.50c.; Lake copper, 27.25c. to 27.50c.; tin, carloads, 39c., and small lots, 41c.; lead, 6.60c.; spelter, 9.75c.; sheet zinc, 15c.; Cookson's antimony, 50c.; other grades, 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 18.50c.; copper bottoms, 16.75c.; copper clips, 17.75c.; red brass, 16c.; yellow brass, 12c.; lead pipe, 4.75c.; zinc, 5c.; pewter, No. 1, 27c.; tinfoil, 28c.; block tin pipe, 33c.

St. Louis

AUG. 21.—Metals have been rather quiet, with the close to-day as follows: Lead, 6.50c.; spelter, 9.50c. to 9.75c.; tin, 39c.; Lake copper, 27.50c.; electrolytic copper, 27c.; antimony, 15.50c. In small lots the quotations were: Lead, 7c.; spelter, 11c.; tin, 42c.; Lake copper, 29c.; electrolytic copper, 28.50c.; antimony, 15c. In the Joplin ore district prices stiffened about \$5 per ton on zinc blende with the average for the week's production of the district, \$61. On calamine the average for the week was \$40. Lead ore was firm at \$65 for 80 per cent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 7.50c.; heavy yellow brass, 10.50c.; heavy red brass and light copper, 14.50c.; heavy copper and copper wire, 17c.; pewter, 25c.; tinfoil, 30c.; zinc, 4.50c.; lead, 5c.; tea lead, 3.50c.

American Vanadium Company Changing Hands

It is stated that as soon as experts pass on the properties of the American Vanadium Company, Pittsburgh, whose vanadium ore mines are located in Peru and reduction works are at Bridgeville, Pa., control of the company will pass into new hands at the price of \$1,000 per share. The company was organized in 1906 with 7000 shares of stock at \$100 par value. James J. Flannery, Pittsburgh, is president of the company, and it is said that he, with members of his family, owns the controlling interest in the company. It is understood that this deal is being put through by J. Leonard Replogle, third vice-president, who left the Cambria Steel Company more than a year ago to become manager of sales of the Vanadium Company.

The Waynesboro Foundry & Machine Company, Waynesboro, Pa., is contemplating installing a new line of foundry equipment for the manufacture of a brass specialty. William H. Strauss is general manager.

THE WEEK'S LABOR TROUBLES

Molders' Property Attached by Bridgeport Foundries

An interesting phase of the week in New England is the action of four Bridgeport, Conn., foundry companies in attaching the funds of the local molders' union, and real and personal property of many of the strikers, in four suits, each for \$50,000 damages. The defendants in each suit are Local Union No. 110, International Molders' Union of North America; J. R. O'Leary, Worcester, Mass., the active agent of the national body in the local strikes; James A. Loveday, a local leader, and several employees of the various plaintiffs. The suits are brought by the Pequonnock Foundry, the Monumental Bronze Company, the Bridgeport Deoxidized Bronze & Metal Company, and the Manufacturers' Iron Foundry. Funds of the local union and a check of \$1,000 for strike relief, from the national body, deposits of strikers, and many parcels of real estate owned by the latter, have been attached.

The complaints recite in detail charges of conspiracy to prevent the operation of plants and of intimidation of men who seek to work. The writs are returnable at the September session of the superior court. An effort will be made to secure a decision on the basis of conspiracy, a decision which would be as sweeping in its results, if sustained in the higher courts, as was that in the famous Danbury hatters' case in regard to the boycott.

The various foundries affected by the trouble will endeavor to reopen their plants this week, being hopeful that the court action will produce a favorable result. It is understood that the majority of the men now out, most of whom are of foreign birth, are desirous of returning to work, but are kept away by threats which it is alleged are being made not only against them but against their wives and children.

Various New England Strikes

Serious trouble has developed at the Westfield Mfg. Company's works, Westfield, Mass., where over 800 men are on strike. An agreement with the company expires Aug. 31, and demands had been formulated and presented. The men claim that they are on strike because of discrimination against their leaders and because the agreement has been ignored. The new demands are for the eight-hour day, the usual overtime which accompanies such demands, and there is a distinct effort to make the plant a "closed shop," the strikers claiming that the shop is 98 per cent organized. It is believed that if the matter of discrimination can be cleared away the men will return under the old agreement pending the drafting of a new one.

A new sort of strike has taken place at the Abbott Ball Company, Hartford, Conn., where the entire force has gone out as a protest against the attitude of President George E. Abbott toward the general superintendent, Charles Koehler, and the shop superintendent, John W. Bryce. It is reported that the introduction of efficiency experts as workmen is at the root of the trouble.

Trouble has broken out in the Reece department of the F. E. Wells & Son plant, Greenfield, Mass. On Aug. 17, 31 out of the 64 men in that department walked out, upon the refusal of the company to reinstate three men who had been discharged. The next morning the strikers picketed the department, which is in a building by itself, preventing some of the others from going to work. On Aug. 19 there were 22 men at work, and on Monday of this week 32. It is stated by the company that the three men were discharged for poor workmanship.

Eight-Hour Demand Refused at New Haven

The local machinists' union at New Haven, Conn., has started an extensive eight-hour campaign among the machine shops of the city. Demands were first made upon the Eastern Machine Screw Company, where the eight-hour day was asked for in place of the present 55-hour week. On the company's refusal, about

30 men walked out. It is reported that all these were from the die-head department, and none from the screw-machine department. Over 80 men left the plant of the Geometric Tool Company after demands that the present bonus be made permanent and that a shop committee be recognized had been refused.

The greatest effort was made at the Winchester Repeating Arms Company. On Wednesday, Aug. 16, a shop committee waited on the company and presented demands for an eight-hour day, which it was understood had been prepared for them by an organizer who had been speaking and holding meetings for some weeks. These demands were refused. The next noon a group of organizers of the machinists' union called a strike, but less than 200 men, according to an officer of the Winchester Company, responded. On Thursday, Aug. 17, all the local newspapers carried a full-page announcement, signed by 51 New Haven manufacturers, which contained this concluding paragraph:

Under present conditions, we will not make any general change in our schedule of working hours nor grant any general demands that are being promoted by such agitators.

Since the publication of this advertisement many of the Winchester employees have asked to be reinstated. More than 100 men have already returned to work, and the company is looking over with care the records for ability and efficiency of many of the others who have asked to return. The Winchester Company has over 18,000 employees, and conditions at the plant are satisfactory, the present trouble having caused but little annoyance. It is noteworthy that a less number of men left these works at this time than when the strike of last fall was called.

Milwaukee Machinists' Strike Weakening

MILWAUKEE, Aug. 22.—(By Telegraph.)—Reports from various shops ordered struck by the machinists' union on the demand for an 8-hr. day indicate that strikers are returning to work in considerable number. It is also reported that several hundred have left for employment in other cities. The situation is exceedingly quiet, and the impression prevails that the strike will fall flat. Only one additional shop was struck last week, about 60 machinists leaving the plant of the Milwaukee Machine Tool Company in West Allis, owned and operated by the Kearney & Trecker Company, where a strike was previously declared. Like other shops in which walkouts have been declared, operations are being continued with much less inconvenience than anticipated, the number of strikers forming only a small part of the total working force. Officials of several large employers are being examined under the discovery statute by attorneys of the unions in an attempt to support conspiracy charges and allegations that a blacklist exists. Evidence indicates that many strikers apply for work in competitive shops. Efforts are being made to induce the patternmakers and molders to undertake sympathetic strikes. The molders, however, are said to be very apathetic because of the blow they received in the strike 15 years ago.

Dayton Machinists' Strike a Failure

Union machinists made demands last week on practically every manufacturing plant in Dayton, Ohio, and the refusal of all employers to concede the eight-hour day with time and a half for overtime and double time on holidays caused a strike on Monday, Aug. 21. Reports from authentic sources are that less than 700 out of a total of 17,000 quit work Monday. The employers state that the demands made cannot be met at the present time and that they will not consider meeting them under any circumstances now. The strike is conceded to be a failure.

Other Localities

Statements have been issued by the Harlan & Hollingsworth Corporation, Wilmington, Del., and J. D. Calloway, secretary of the Boilermakers, Iron Shipbuilders and Helpers of America, to the effect that the strike which has been in progress for eight weeks has been settled to the mutual satisfaction of both sides.

Prospects for an early settling of the longshoremen's

strike, which has crippled shipping in all Puget Sound ports since June, are now somewhat brighter, although no definite agreement has been reached. The United States Department of Labor is taking energetic measures to bring about an arbitration.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

CONDITIONAL SALES OF MACHINERY IN NEW YORK.—The New York statute which authorizes the buyer under a conditional sale contract to recover amounts paid on the price of an article when the seller retakes possession under reservation of title, on the buyer's default in making payments, unless the seller retain possession for 30 days after the retaking, during which time the buyer may redeem, and unless the seller at the expiration of such period sells the property at public auction, was designed to mitigate the harshness to which buyers are sometimes subjected under conditional sales contracts. Hence, it is held that, after becoming in default, a buyer cannot validly waive compliance on the seller's part with the mentioned provisions of the law, unless the waiver agreement be based upon some new consideration. But when, after default, the parties enter into a new contract, and attempt in good faith by such contract to settle the differences between them, a different case is presented, which is not within the protection of the statute. (New York Court of Appeals, *Adler vs. Weis & Fisher Company*, 112 North-eastern Reporter, 1049.)

RIGHT TO FREIGHT OVERCHARGE REFUND.—When a railroad company has collected freight overcharges on a series of shipments between the same parties, and a refund is made, it belongs, as between the seller and the buyer, to the one who bore the freight charges primarily. So, it appearing that goods were sold under contracts requiring delivery at the destination, the buyer's place of business, the seller is entitled to the refund, although the buyer paid the freight charges in the first instance, they being credited to him on the agreed purchase price of the goods. (Minnesota Supreme Court, *Jennison Brothers & Co. vs. Chicago & Northwestern Railway Company*, 158 Northwestern Reporter, 398.)

MISTAKE IN DRAWING SIGHT DRAFT.—When several articles are sold under agreement that they are to be shipped under bill of lading attached to draft for the price, the seller's mistake in omitting to include the price of one of the articles prevents the buyer from acquiring title to that article notwithstanding the actual delivery, and the seller is entitled to treat the buyer's resale of that article without payment of the price as a wrongful conversion, especially when the buyer knows of the mistake. (Alabama Supreme Court, *Finney vs. Studebaker Corporation of America*, 72 Southern Reporter, 54.)

TITLE DOES NOT PASS TO BUYER FROM THIEF.—An employee intrusted with his employer's goods, but without authority to sell them in his own name (for instance, a shipping clerk), cannot pass title to a third person under such a sale. Hence, the employer is entitled to recover the value of the property from the third person, regardless of that person's innocence in the matter. (Kansas Court of Appeals, *Pittsburgh & Midway Coal Company vs. Laning-Harris Coal Company*, 187 Southwestern Reporter, 263.)

INVALIDITY OF VERBAL SALES CONTRACT NOT WAIVED.—On being sued for claimed breach of a contract to buy goods of the value of \$500 or more, defendant's right to defeat recovery on the ground that the contract was not in writing, and that there was no partial delivery or payment on the price—required by statute to make the agreement valid—is not affected by any general trade custom of any usage between the parties of treating oral contracts as being valid. The parties may waive compliance with the statute in a particular instance, but that does not preclude reliance upon it as to another and unperformed contract. (Rhode Island Supreme Court, *Webster-Tapper Company vs. Eastern Hay Company*, 98 Atlantic Reporter, 50.)

AN INDUSTRIAL RAILROAD CASE

Trunk Lines May Divide with a Steel Corporation Switching Road

WASHINGTON, D. C., Aug. 22, 1916.—Some important principles to be observed in the determination of the constantly recurring question as to the status of so-called industrial railroads in the iron and steel trade are laid down by the Interstate Commerce Commission in a report dealing with the interchange switching charges of the Johnstown & Stony Creek Railroad Company, a short line controlled by the Federal Steel Company, a steel corporation subsidiary. The principal questions considered in this case are, first, whether the Johnstown & Stony Creek may lawfully be paid any divisions by its trunk line connections, and second, whether its connections may properly refuse to accord points on the Johnstown & Stony Creek as low rates as they maintain to and from points on their own rails in the same vicinity.

This railroad is a short switching line that interchanges traffic with the Baltimore & Ohio Railroad and the Pennsylvania Railroad at Johnstown, Pa. It was originally owned by the Lorain Steel Company, but at present all but six shares of its stock are in the name of E. H. Gary, the six excepted shares being held by officers of the Lorain Steel Company. Fifteen industries beside the steel company are served directly and many more indirectly through tracks maintained by the Johnstown & Stony Creek, and the commission, therefore, holds that it is a common carrier industrial line, and may lawfully be paid allowances or divisions by the trunk lines with which it connects on all traffic including that to and from the plant of the proprietary company. Excessive divisions, however, the commission holds, would constitute rebates to the Lorain Steel Company. The general principles applicable for the determination of fair divisions in the cases of individual lines are thus set forth in the Commission's report:

In so far as the industrial line serves the plant in interplant switching and other purely plant service the cost of such service and the investment in facilities used exclusively to perform that service must be excluded in calculating the cost of the switching service to and from the trunk lines. The investment in facilities used both for plant service and interchange switching can only be included in the proportion that they are used in interchange switching. Interior plant switching or any other service differing radically in nature from the general work of switching cars between industries and connections should be segregated as to investment and operating costs of the industrial line so far as this may be feasible. The engine hour will usually be found a safer guide than cars handled for making this general separation. For interior plant switching the industry benefited should be charged with the allocated capital and operating costs. The remaining operating and capital costs measure the maximum which may be received net for other switching either in the form of switching charges or allowances, there being a minimum charge for the shortest switching and a somewhat higher charge for the longer distance switching. From its entire business the industrial line should not earn more than a fair return on the property devoted to the public use, less reserve for accrued depreciation, and including material and supplies in the investment.

The Commission decides that the evidence fails to establish that the Pennsylvania Railroad would unduly prejudice shippers on the Johnstown & Stony Creek by refusing to apply its Johnstown locality rates to and from points on the Johnstown & Stony Creek, and that, in the absence of discrimination, such action would not be improper. The Commission adds that the possible application of the commodities clause of section 1 of the Interstate Commerce act, restricting the transportation of commodities owned by the railroads transporting them, has not been considered in this case, and is not decided.

W. L. C.

Powdered coal is to be used as the fuel for puddling, heating and annealing furnaces by the Schuylkill Iron Works of the Alan Wood Iron & Steel Company at Conshohocken, Pa. The Holbeck system, installed by the Bonnot Company, Canton, Ohio, is to be used.

Pittsburgh and Nearby Districts

The 127-in. plate mill at the Shoenberger works of the American Steel & Wire Company at Pittsburgh, which has been undergoing alterations and improvements for several weeks, is expected to start about Sept. 1. It will roll plates up to 120 in. wide, and will turn out about 4000 tons per month. The American Steel & Wire Company will operate the mill in connection with its other departments at the Shoenberger works, but the output of plates will be sold in the open market by the Carnegie Steel Company, Pittsburgh, and the United States Steel Products Company, New York City, the latter handling export orders. At the Donora, Pa., zinc works of the American Steel & Wire Company, eight out of ten zinc furnaces are running, while the sulphuric acid department is in full operation.

Francis L. Arensberg, formerly connected with the McCullough-Dalzell Crucible Company, Pittsburgh, has bought a site, 45 x 240 ft., near Hawkins Station, on the Pennsylvania Railroad, a few miles east of Pittsburgh, on which he proposes to build a plant for the manufacture of crucibles for melting brass for making brass castings.

A. Foster, Park Building, Pittsburgh, is in the market for one 4-in. and one 12-in. standard pipe machine.

The Petroleum Iron Works Company, Sharon, Pa., builder of steel plate construction, has recently bought 66 acres adjacent to its works and now owns a total of 108 acres. No use will now be made of the new property, but in time it will likely be utilized for large plant extensions. The company has received an order from the Petroleum Refining Company for the erection of a refinery near Houston, Tex., to cost about \$1,000,000, and its entire capacity is now about sold up for the next six months in the production of tank cars and oil and gas tanks and similar products.

The National Foundry Company, Erie, Pa., is seeking one 5 or 10 ton three-motor crane, in good condition, to operate on 220 volt direct current and having a span of 38 ft. 6 in.

The Warren Tool & Forge Company, Warren, Ohio, has awarded contracts for the erection of a new warehouse and machine shop, and is contemplating installing two departments which will require additional buildings and equipment. The additions under contract will increase the capacity of the plant about 20 per cent. About Jan. 1 the company will add equipment to include an axe plant and will also manufacture handle hammers, beam-peen hammers and a line of machinists' hand tools. These additions will about double the capacity of the plant. A drop forge department is also contemplated.

The Follansbee Brothers Company, Pittsburgh, which operates an open-hearth steel plant and sheet and tin-plate mills at Follansbee, W. Va., and has been considering the erection of a new plant at some other location near the Pittsburgh district, has been offered several free sites in West Virginia and Ohio. The citizens of Toronto, Ohio, raised \$37,000 for the purchase of a site which was offered free to the company in order to secure the new plant. As yet, however, no decision has been made as to whether a new plant will be built.

The McKeesport Tin Plate Company, McKeesport, Pa., is starting this week eight more of its new tin mills. Five were started about a month ago. The remainder of the 22 new mills will probably be started in September. All the mills are electrically driven. The company will have a total of 42 hot tin mills when all are completed, constituting the largest individual tin-plate plant in the country.

Arthur Weisberg has purchased, through the Exchange National Bank, Pittsburgh, receiver for the H. Adler Company, manufacturer of stoves and ranges, four acres and a manufacturing plant at Carnegie, Pa. He contemplates the incorporation of a company under the name of the Acme Stove & Range Company to continue the manufacture of stoves and ranges. The plant has been operated under a receivership for some time.

The copartnership of Dilworth, Porter & Co., Pittsburgh, manufacturers of railroad spikes and tie plates, which has existed since 1852, being one of the oldest manufacturing concerns in the Pittsburgh district, will be changed to a corporation to be known as Dilworth, Porter & Co., Inc. The incorporators of the new company are J. Dilworth Beggs, Walter F. Schleiter and Joseph Dilworth.

Reports that a number of Youngstown steel manufacturers are interested in a project to build a new steel plant at Michigan City, Ind., to employ 5000 or more men, are denied. None of the leading officials of steel companies in the Youngstown district knows anything of such a project.

Youngstown Sheet's By-Product Coke Plant

The by-product coke plant of the Youngstown Sheet & Tube Company at East Youngstown, Ohio, contains four batteries of 51 Koppers cross-regenerative ovens, each with the necessary apparatus for the recovery of tar and the manufacture of ammonium sulphate by the Koppers direct process. On Aug. 18 two of the four batteries, or 102 ovens, were put in operation, and the other two are expected to start about Sept. 10.

The special feature of this plant is the installation of large units in the by-product building; i.e., large capacity in tar extractors, exhausters and saturators. The by-product recovery units are said to be the largest ever built. Each set of units is to handle the total gas of 102 12½-ton ovens operating on 15 hours' coking time. The plant has three sets of these units, one for each two batteries, while one is held in reserve. The coal-handling plant was built by Fairbanks, Morse & Co., and the coke-handling equipment by the Robins Conveying Belt Company. The plant was started without any difficulty and worked very smoothly.

The whole design and construction of the plant are stated to represent the latest development and highest standard of by-product coke plants. A large machine shop has been installed, which is equipped to do any work required on the coke plant, and there is also modern boiler equipment, the boilers being equipped with Parsons blowers and feeders for burning coke breeze and with gas burners for burning natural and coke-oven gas.

The plant as built will each month consume 100,000 tons of coal and will turn out about 67,000 tons of coke, 750,000 gal. of tar, 2,200,000 lb. of ammonium sulphate and 600,000,000 cu. ft. of gas. The above outputs are based on an operation of 18 hours' coking time, but the plant is designed to operate on as low as 15 hours' coking time.

Spot Welding Patent Decision

A decision was given July 11, 1916, and an interlocutory decree was issued July 17, by the United States District Court, District of Massachusetts, in the case of the Thomson Electric Welding Company, et al., vs. Barney & Berry, Inc., holding that the defendants had infringed the Harmatta patents on the process of spot welding. The Universal Electric Welding Company, licensee under the Harmatta patents, was associated with the Thomson Electric Welding Company as complainant. The decision thus given was in pursuance of an opinion given by the United States Circuit Court of Appeals for the First Circuit, on Oct. 5, 1915, in which a decision in the district court was reversed and the case remanded for further proceedings. The plaintiffs did not seek recovery of profits for any use of the process before the patent issued on Dec. 3, 1912, nor for any articles produced before that date. The decree of July 17 provides for a referee to determine profits derived by the defendant from infringing machinery and to assess damages. An injunction was also issued restraining the defendant from practising the process of electric welding. One of the questions raised in the litigation was whether the operation of welding skates, as practised by the defendants, came under the designation "spot welding." The early Thomson patents on electric welding, including the process of butt welding, were not involved in the action.

PERSONAL

The American Steel & Wire Company announces the following appointments: F. C. Gedge, who died July 28, and was manager of the wire mills of the company in the Chicago district—including Anderson, Joliet, Waukegan and DeKalb—has been succeeded by W. L. Hayes, formerly assistant manager of the Cleveland district. W. C. Stone, formerly assistant manager of the Chicago district under Mr. Gedge, succeeds Mr. Hayes, as assistant to R. W. Ney, manager of the wire mills in the Cleveland district. George W. Sells, formerly superintendent of the North works at Worcester, Mass., has been made assistant manager of the Chicago district, succeeding Mr. Stone. E. H. Broden, formerly superintendent of the Braddock, Pa., works, has been made superintendent of the Rankin, Pa., works, succeeding H. S. White, who is absent from duty on account of ill health. F. B. Hill, formerly superintendent of the Donora wire works, succeeds Mr. Broden as superintendent of the Braddock works. F. E. Gage, formerly assistant superintendent of the Rankin works, has been appointed superintendent of the Donora works, succeeding F. B. Hill.

Arthur E. Woolsey, formerly manager of the Tata Iron & Steel Company's steel works at Sakchi, India, who returned to the United States some months ago, has become manager of the plant of the Anniston Steel Company at Anniston, Ala.

Irving A. Sibley, Jr., has been appointed secretary and treasurer of the Decatur Malleable Iron Company, Decatur, Ill.

W. E. Schaeffer, formerly manager of the Duluth Corrugating & Roofing Company, has resigned to become general superintendent of the Racine Mfg. Company, Racine, Wis.

A. C. Johnson, president Gisholt Machine Company, Madison, Wis., will take an extended vacation in the Canadian Rockies.

Robert MacDonald, formerly president of the Associated Foundry Foremen, and manager of the Samuel L. Moore & Sons Company, Elizabethport, N. J., for the past four years, has been appointed assistant to General Sales Agent D. A. Barkley, Lehigh Coke Company, South Bethlehem, Pa.

Milton O. Knauss, superintendent Empire Iron & Steel Company's furnaces at Catasauqua, Pa., was severely injured Aug. 17, when struck by a heavy hammer swung by a workman.

Arthur King, president Middletown Car Company, Middletown, Pa., is critically ill.

Harold Lomas, for over 13 years a member of the sales department of the Crocker-Wheeler Company, Ampere, N. J., was killed July 1 in an engagement between the British and Germans at Fricourt, France. He had served the Crocker-Wheeler Company as manager of its Denver office and also as manager of its Baltimore office. At the time of his death he was holding the rank of first lieutenant in the 20th Manchester Regiment.

Nov. 21 has been set as the date for a public dinner which will be given in Baltimore, in honor of Charles M. Schwab and in recognition of the great improvements which will be made by the Bethlehem Steel Company at its Sparrows Point plant.

Creditors of the L. P. C. Motor Company, Racine, Wis., builder of pleasure automobiles, which made a voluntary assignment in November, 1915, have received checks for 100 per cent of their claims, although the actual realization from the assets was something less than 25 per cent. The full payment was accomplished by the personal sacrifice of Capt. William Mitchell Lewis, president and chief stockholder of the company, who gave his check to the assignee to cover every claim in full.

W. F. French has been appointed purchasing agent of the Bour-Davis Motor Car Company of Detroit by President Charles J. Bour. Mr. French was formerly

in the mercantile and commercial field in Chicago in a similar capacity.

N. E. Wahlberg, chief engineer of the Oakland Motor Car Company, Pontiac, Mich., has resigned to become chief engineer of the Nash Motors Company, Kenosha, Wis., the former Thomas B. Jeffery Company. In making the change Mr. Wahlberg becomes associated again with his former chief, C. W. Nash.

Charles A. Goodspeed, formerly secretary and manager of the Goodspeed-Detroit Mfg. Company, Ltd., and more recently with the Timken-Detroit Axle Company, has resigned to take charge of the factory of the Nelson-Blanck Mfg. Company, Detroit.

H. E. Miller, Jr., formerly with the Pittsburgh Plate Glass Company and the Lilly Varnish Company, is now representing the Moller & Schumann Company, Hilo varnish manufacturer, Brooklyn, in eastern Massachusetts, Rhode Island, and eastern Connecticut, covering both the retail paint trade and the manufacturers of wood and metal products.

O. W. Cook, who has been manager of works of the Canadian Cartridge Company, Ltd., Hamilton, Ont., has recently been appointed manager of the company.

C. M. Barron, who for the past five years has been studying and cultivating the Australasian market for railroad supplies, machine tools and raw materials, has become connected with Charles M. Terry, Inc., of Sydney, Australia, as consulting and purchasing engineer in the company's offices at 23-25 Beaver Street, New York.

Lake Superior Mining Men to Visit South

The Lake Superior Mining Institute will hold its twenty-first annual meeting in Alabama, from March 13 to 17, 1917, with headquarters at Birmingham. A circular has been issued by A. J. Yungbluth, secretary, Ishpeming, Mich., which advises the members that the party will assemble in Chicago on March 10 or 11, and travel to Birmingham by special train, providing a sufficient number shall signify the intention to take the trip. It is proposed that one day's stop be made at Chattanooga and Chickamauga, to visit points of interest, and possibly other stops as may be arranged later. At Birmingham, two or three days will be spent in visiting mines and manufacturing plants, with business meetings for the reading and discussion of papers. Cordial invitations have been received from members of the Southern iron trade.

Machine Tool Builders' Convention

The National Machine Tool Builders' Association will hold its fall convention on Tuesday and Wednesday, Oct. 24 and 25, at Hotel Astor, New York City. The officers of this organization are as follows: J. B. Doan, president, Cincinnati; D. M. Wright, first vice-president, Hartford, Conn.; A. H. Tuechter, second vice-president, Cincinnati; Albert E. Newton, treasurer, Worcester, Mass.; Charles L. Taylor, secretary, Hartford, Conn.; Charles E. Hildreth, general manager, Worcester, Mass.

The Henry A. Hitner's Sons Company, Huntingdon Street and Aramingo Avenue, Philadelphia, has purchased at public auction the property of the Lancaster & Southern Traction Company, Lancaster County, Pa., for \$20,575. The line is 7 3/10 miles long and was chartered in 1903 for ninety-nine years with stock of \$100,000 and bonds of \$109,000. The rails are 60 lb. to the yard and it is possible that they will be sold for export. Plans are on foot, however, looking toward the reorganization of the company.

The ore steamer ordered by M. A. Hanna & Co. for the service of the Donner Steamship Company, now under construction in the yard of the American Shipbuilding Company at Lorain, Ohio, will be launched Sept. 9. The steamer will be named the H. F. Black.

Machinery Markets and News of the Works

MANY SMALL ORDERS

Bulk of Business Is for a Few Tools

Railroad Shops Busy, but Little Buying Results— Gas Engine Builders Consolidate—Canadian Munition Labor Shortage

The market is very active, but the bulk of the business is being done rather quietly. Some large-lot orders have been placed, both for shell contract work and for expanding home manufactures. Russian interests have closed for one lot of 70 engine lathes, and the Russo-Baltic Car Works bought about 60 tools, about half its requirements, including 20 turret lathes and 30 automatics. In Chicago, besides a multitude of small orders, lists totaling 30 turret lathes and 20 miscellaneous tools were contracted for by shell manufacturers.

The greatest demand is now principally for grinding and milling machines and similar equipment. Special machinery is sought in quantities much greater than such tool builders can begin to produce. In the Cincinnati territory, however, lathe business predominates.

Railroad shops are reported very busily engaged in repairing rolling stock, particularly around Cincinnati; but neither here nor elsewhere has it resulted in much if any buying.

Jobbers' stocks of twist drills and high-speed cutting tools have been drawn on in some centers, so much so that it is difficult to meet deliveries on current orders; and the rapid rise in the cost of materials makes it hard to fix correct selling prices for these commodities.

In California important activity is developing in the gas engine-building industry. The Standard Gas Engine Company bought the Corliss plant at Petaluma, and the Imperial Gas Engine Company and the Atlas Gas Engine Company have been consolidated.

To the list of oil-refining and other interests which have gone into the shipbuilding business in the past year is now added the meat-packing company, Swift & Co., which will put in a plant at Flavel, Ore. The shipbuilders are the largest machine-tool buyers at the present time on the Pacific coast.

The Canadian munition shops are hampered by a scarcity of labor, and it is possible that mechanics will be kept out of the ranks, even though enlisted, in order to prevent delay in producing vitally needed war supplies.

New York

NEW YORK, Aug. 23, 1916.

While the last delivery sheets from the shops show that machine-tool builders are steadily catching up with orders, they promise little assistance to dealers in a market in which the demand for quick delivery is growing more urgent. The surplus of newly-completed machines with many in the trade is not sufficient to meet the strong demand for a few tools now coming from many sources, and these dealers report deliveries worse off with them. One lot of automatics, for instance, promised for Aug. 15 has been put over to Sept. 15. The present need is principally for automatics, grinding and milling machines and allied equipment. Lathes are plentiful.

The effort to get equipment to Archangel before the close of shipping in the White Sea is a prominent factor in hurrying Russian buyers. In addition to the short time remaining, a scarcity of bottoms, especially in the Pacific, is still seriously interfering with export orders. In one case over \$100,000 worth of automatics are held in warehouse awaiting permit from the Russian Government to forward to Vladivostok.

The Russo-Baltic Car Works, 1 Madison Avenue, New York, which is equipping a plant at Petrograd to produce about 10 automobiles a day, has purchased about half of its requirements, including 20 turret lathes, 30 automatics and several other machines. Another Russian manufacturer closed last week for 70 engine lathes.

The General Electric Company remains in the market and is adding to its requirements gradually.

The Baltimore & Ohio Railroad has just bought four turret lathes and some other tools. Its purchases in the past few weeks amount to about 20 tools. Other railroads are doing little.

The Downs-Slater Foundry Company, Wharton, N. J., has secured a site at Dover, N. J., from the Dover Board of Trade, at Salem Street and the Central Railroad of New Jersey, on which it will erect several buildings, including a main plant, 40 x 100 ft.

The Moore Steam Turbine Corporation, Wellsville, N. Y., has let contract for its new plant, 90 x 140 ft., of brick and steel, and for a boiler plant and test floor. The plant is to be completed by Oct. 1. It will manufacture steam turbines and double helical reduction gears.

The Secretary of State, Albany, has recorded the following increases in capital stock recently: The Highlander Machine Company, Rochester, N. Y., \$20,000 to \$50,000; the Evans Addressing Machine Company, \$20,000 to \$50,000; the Salisbury Wheel & Mfg. Company, Jamestown, N. Y., \$500,000 to \$1,000,000; the National Bridge Works, Review Street, Long Island City, N. Y., \$225,000 to \$300,000; and the Planographic Equipment Company, 52 Duane Street, New York, \$75,000 to \$500,000.

The business of the Covert Motor Vehicle Company, Lockport, N. Y., was recently reincorporated as the Covert Gear Company and its capital stock was increased to \$1,000,000. It is erecting an additional factory building at a cost of over \$50,000, and on completion about Oct. 1 will devote it to the manufacture of its line of transmissions. The present officers of the company are: B. V. Covert, president; P. A. Clum, treasurer; E. F. Fritton, secretary, and F. E. Mosher, general manager.

The Ferguson Steel & Iron Company, Buffalo, James E. Ferguson, president, has purchased 16 acres of land at Greene and Stanley streets and the New York Central Railroad, adjoining its plant, to provide for contemplated plant additions.

The Thomas Millen Cement Company, Jamesville, N. Y., Roger Williams, manager, has let general contract to the W. J. Burns Company, Syracuse, for the rebuilding of its cement manufacturing plant, including a new four-story building.

The Guarantee Construction Company, 140 Cedar Street, New York City, has the general contract for the erection of powerhouse, 83 x 86 ft., two stories, for the New York Air Brake Company, at Watertown, N. Y. Charles A. Starbuck is president.

The United States lighthouse inspector, Federal Building, Buffalo, is receiving sealed proposals for furnishing new boilers, boiler circulators and sludge removers for the lighthouse tender *Crocus*.

The Peerless Husker Company, Buffalo, will build a brick and tile addition to cost \$12,000, to the factory it recently purchased at Cornwall and Northumberland avenues and the Erie Railroad. Equipment for the manufacture of corn huskers and canning machinery will be installed.

The Syracuse Gage & Valve Company, Syracuse, N. Y., capitalization \$100,000, has been incorporated to manufacture gages, faucets, valves, etc. E. A. McDonald, H. J. Crane and H. E. Newell, Syracuse, are the incorporators.

The Delaware, Lackawanna & Western Railroad is erecting at South Michigan Avenue and the Buffalo River, Buffalo, a concrete powerhouse to cost \$18,000 for use in connection with its new passenger terminal.

The Taber Pump Company, manufacturer of rotary

pump. Buffalo, is building an addition to its factory at Elm and Sycamore streets.

The Warsaw Construction Company, Warsaw, N. Y., has received contract for rebuilding the sewage pumping station at Batavia, N. Y., which was recently destroyed by an explosion.

The Binghamton Brick Company, Binghamton, N. Y., has filed articles of incorporation to manufacture bricks, clay and shale products, artificial stone and building materials. The capital stock is \$30,000. The incorporators are C. M. Crook, 120 Chenango Street; F. W. Welsh and W. T. Couper.

The Niagara Emery Mills, Inc., Lockport, N. Y., will erect an addition to its manufacturing plant on Garden Street to cost \$16,000.

The Heller Brothers Tool Company, 879 Mount Prospect Avenue, Newark, N. J., is seeking a No. 1 Pratt & Whitney die-sinking or profiling machine.

J. L. Osgood, Buffalo, N. Y., is in the market for machinery including shaping, milling, grinding and drilling machines and lathes in first-class condition.

Philadelphia

PHILADELPHIA, Pa., Aug. 21, 1916.

The Jonathan Bartley Crucible Company, Oxford Street, Trenton, N. J., has awarded contract for the construction of a three-story addition, 75 x 100 ft., which will add about 38,000 sq. ft. to its drying space. The company will add equipment to double its present producing capacity, and will add another kiln. The cost of the improvements will be about \$25,000. Lewis H. Lawton is secretary and general manager.

The Brass Specialty Mfg. Company, 1641 North Tenth Street, Philadelphia, Pa., plans to enlarge its plant to meet an increasing demand for pressed and spun metal specialties, and will also put on a night shift. G. W. Ullman has joined the company and will be export manager.

The Ertel Brothers Company, Williamsport, Pa., incorporated with a capital stock of \$50,000, has taken over the plant formerly operated by Ertel Brothers, and is continuing the business of manufacturing cigar and other boxes. Henry O. Ertel is president and general manager.

The American Auto Tire Company, 154 North Broad Street, Philadelphia, has purchased the old Patterson textile mills in Chester, Pa. The mills will be enlarged and converted into an automobile tire manufacturing plant. George G. Meeley is president, and associated with him is Hugh B. Turner, secretary and treasurer of the American Auto Tire Company, and several Californian capitalists. The sale of the Patterson mills is significant in its demonstration of the industrial progress of Chester in the last year. About six months ago E. B. Dorsett of Mansfield, Pa., who held a \$57,000 mortgage on the property, paid \$2,000 for it. It is authoritatively stated that Mr. Meeley paid \$90,000 for the same property. The Patterson mills were erected at the close of the Civil War. They are on a tract of six acres on Chester River and the line of the Philadelphia, Baltimore & Washington Railroad. The structures consist of the main building, of stone, 76 x 316 ft., three stories; a two-story brick building, 80 x 188 ft.; a brick and frame building, 64 x 123 ft., a brick building, 33 x 74 ft.; a brick boiler and engine house and a two-story brick and stone office building.

The Thermoid Rubber Company, Trenton, N. J., has under way construction work designed to double the present capacity of the plant.

The plant at Fourteenth and Ford streets, Lebanon, Pa., formerly occupied by the Lebanon Forge & Machinery Company, has been leased by Gerdes & Co., Inc., manufacturer of patterns, castings, forgings, machine and plate work, 30 Church Street, New York. The company is now equipping it with machine tools to operate on special and jobbing work. In addition to general machine shop work it will specialize in gear cutting. Used machine tools in good condition are being sought by the company, which is also desirous of receiving catalogs and literature. H. T. Gerdes is treasurer.

The Macungie Brass & Mfg. Company, Macungie, Pa., will erect an additional building, 50 x 120 ft., to be devoted to jobbing work. It will give employment to about 30 additional workmen.

The Puritan Mfg. Company, Ellenton, Pa., capitalized at \$6,000, is building a plant, 30 x 50 ft., three stories, metal clad. It is equipping it with new machinery, including a 100-hp. power plant, and will employ about 30 workmen for the manufacture of clothes pins. It is contemplating installing machinery for manufacturing wooden thread spools. J. F. Clark, Canton, Pa., is president and treasurer. Curtis W. Potter, Ellenton, is secretary and general manager.

The Whitney Glass Works, Bullitt Building, Philadelphia, owing to the great and growing demand for glass bottles,

has decided to augment its plant at Glassboro, N. J., by building a new factory to occupy an entire city block. It will be 264 x 411 ft., and it is expected to be ready for operation in about six months. The building will be one story, of brick, steel and concrete. The great domestic demand at this time is due to the stoppage of the foreign manufacturing. There is a large export trade for American-made bottles now; but the company has few foreign orders, and the conclusion to build another factory was due to the natural growth of its domestic business. Charles Y. Yost is secretary and treasurer.

The York Ice & Milk Company, York, Pa., has decided to install two more refrigerating units of 80 tons capacity every 24 hr., and will start construction work about Oct. 1.

New England

BOSTON, Mass., Aug. 21, 1916.

The Howe Scale Company, Rutland, Vt., has awarded a contract for a machine shop and assembling building, 60 x 204 ft. The new shop will have a 10-ton crane.

The Abrasive Machine Tool Company has been granted tax exemption for ten years by East Providence, R. I., on a plant which it proposes to erect opposite the plant of the Eastern Bolt & Nut Company. Frank N. Macleod, Providence, represented the company and stated that it would build a plant about 50 x 150 ft., with ell, 25 x 30 ft., for the manufacture of machine tools, particularly grinding machines, and that the company would be incorporated soon and expected to be in operation within three months.

The Metals Production Equipment Company, Springfield, Mass., suffered a loss of \$5,000 by a fire in its pattern-storage house.

The Associated Tanning Machinery Company, Salem, Mass., which was recently organized and leased one floor of the new Ceodon Building, has taken a lease of the entire structure.

The Norris Noiseless Pedal Action Company, Stoughton, Mass., has opened an iron foundry in a new addition to its plant. The company manufactures iron and brass piano hardware.

The Millers Falls Company, Millers Falls, Mass., is installing in its plant the machinery of the Ford Auger Company, Holyoke, Mass., which it recently purchased.

The general and experimental machinery business of Ira A. Smith, Beverly, Mass., has been purchased by Edward R. Fallon and John F. Conley, who have opened a new machine shop at 87 Rantoul Street.

The City Foundry Company, Plain Street, Lowell, Mass., is building an addition, 80 x 80 ft.

The Atwood Machine Company, Stonington, Conn., has purchased land adjoining its plant for further expansion of its facilities.

The brass novelty shop, at Roxbury, Conn., of Murray & Sorenson, New York City, was burned Aug. 12 with a loss of about \$30,000.

Edward E. Bartlett, Hyde Park, Mass., manufacturer of presses, is to remove his business to the plant formerly occupied by the Flather Planer & Shaper Company, at Nashua, N. H.

The Watts Laundry Machine Company, Willimantic, Conn., organized a few months ago, has purchased a site in Willimantic on West Main and Winter streets, where it will build a factory for the manufacture of a new mangle invented by Timothy Watts. The company is now occupying a portion of the plant of the Vanderman Mfg. Company.

The Cone Automatic Machine Company, Windsor, Vt., has been incorporated with capital stock of \$200,000 by Frank L. Cone, Cecilia F. Gilraiss and Harry M. Davis.

The Brown & Sharpe Mfg. Company, Providence, R. I., has been granted a permit for an addition, 72 x 170 ft., one story.

H. J. Keating and P. L. Grimes, Milford, Conn., have opened a factory on Gulf Street for the manufacture of aeronautical instruments for this and other governments.

The National Scale Company, Holyoke, Mass., is building a concrete building which will be used for a newly established metal stamping department. It will cost \$30,000.

The foundry of Charlette Brothers, Blackstone, Mass., was burned Aug. 17 with a loss of about \$15,000.

The North & Judd Mfg. Company, New Britain, Conn., has purchased land opposite its present factory as a site for a future building.

The Smith & Winchester Mfg. Company, South Windham, Conn., has awarded the contract for its new factory building, 30 x 150 ft., one story.

The permit for the first of the additions to be made at the plant of the American Chain Company, Bridgeport, Conn., has been granted. The size is 50 x 122 ft., one story.

The American Graphophone Company, Bridgeport, Conn., has awarded a contract to the Austin Company for the erection of another addition to its new plant on Barnum Avenue. The new structure will be 70 x 200 ft., one story.

The Bridgeport Housing Company, Bridgeport, Conn., has been incorporated with capital stock of \$1,000,000 by Charles G. Sanford, H. H. DeLoss and DeVer H. Warner. This company is an outcome of the work of the Bridgeport Chamber of Commerce to promote adequate means for solving the pressing housing problem of this rapidly growing community. It has been estimated by experts that homes for 9000 families must be provided before the cold weather.

Chicago

CHICAGO, ILL., Aug. 21, 1916.

The recent group of orders for shells in which the larger manufacturers have chiefly participated has been followed by the distribution of a large number of machine-tool orders. One order for 30 turret lathes, another for 20 machines, an increased demand for boring mills and a renewal of the buying of shell-finishing automatics are some of the evidences. Tool grinding and milling machines are still the object of seemingly insatiate inquiry. Automobile manufacturers are continuously in the market for equipment in quantity second only to the requirements of the munitions manufacturers. Machine-tool builders are finding a large demand for special machinery, the number of shops equipped for such work and willing to undertake it being far from adequate for the work offered. Miscellaneous trade in machinery lines is without feature and rather limited in volume.

The Simpson-Frisch Company, Chicago, an organization recently effected by Paul Frisch, formerly associated with the National Lamp & Brass Mfg. Company, and Mr. Simpson of the Klemp & Simpson Company, will operate an ornamental iron shop at Franklin and Ontario streets. The capital authorized is \$5,000.

The Johnson Motor Company, Chicago, has been organized with a capital of \$25,000 and will conduct a manufacturing plant. The incorporators are Jay M. Johnson, Walter W. Gardiner and Philip Woodworth, 7 South Dearborn Street.

The Sheet Metal & Conveyor Company, Chicago, has been incorporated with a capital of \$5,000 to manufacture conveyors and operate a general sheet-metal shop by A. J. Thompson, Georgiana Thompson and Herman F. Kroeplin, 8026 South Peoria Street.

The Stewart-Warner Speedometer Company, Chicago, which has been operating a machine shop at Beloit, Wis., will remove all operations to its Chicago plant, converting the Beloit shop into a foundry.

The Donahue Steel Products Company, Chicago, formerly in the First National Bank Building, has moved to 454 Peoples Gas Building. The company is the manufacturers' representative in a variety of lines, including power hammers, drop forgings, screws, bolts and conveyors.

The Perfection Sand Blast Company, Chicago, has been organized, and will have a capital of \$2,500, by G. W. Miller, 38 South Dearborn Street; Edward, Robert and E. G. MacLane.

The Velie Engineering Company, Moline, Ill., is about to erect a factory for the building of trucks, the plant to cost \$50,000. C. B. Rose is chief engineer.

The W. T. Rawleigh Company, Freeport, Ill., has acquired a new factory site and has had plans prepared for the erection of a plant which will include machine shop, foundry and a power plant with capacity sufficient for the sale of light and power for municipal consumption.

The Canedy-Otto Mfg. Company, Chicago Heights, Ill., Charles H. Thomas, president, manufacturer of blowers, has added 40,000 sq. ft. to the floor area of its plant.

The North Chicago Foundry Company, North Chicago, Ill., has been sold to Chicago interests, representing, it is understood a large Chicago foundry now tied up by labor troubles.

J. J. Welsh and E. C. Shaw, Galesburg, Ill., have acquired the foundry and shop of G. D. Colton & Co., the equipment of which they will enlarge, continuing in the manufacture of furnace grates and castings.

Harold King Wrench Company, Indianapolis, Ind., has been organized with a capital of \$50,000. The directors of the company are Harold King, H. and M. King.

The Eclipse Dump Box Company, Hammond, Ind., a Chicago suburb, is contemplating the removal of its business to Beloit, Wis., where it proposes to erect a plant to cost \$20,000.

The National Car Coupler Company, Attica, Ind., is completing the addition to its foundry, 150 x 300 ft., at a cost of

\$50,000. Among the new equipment installed are three cranes.

The capitalization of the Haynes Automobile Company, Kokomo, Ind., has been increased from \$1,200,000 to \$1,000,000, half of which is in common stock, and half in 7 per cent preferred. Proceeds of the sale of the preferred stock will be used for the erection of extensive additions to the company's factory.

The Amalgamated Machinery Corporation, 72 West Adams Street, Chicago, Ill., plans to exhibit one of its machines for boring and finishing the inside of large, high explosive shells at the American Foundrymen's Association Exhibit at Cleveland, Sept. 11 to 16, in order to show its large frame, which consists of a 5-ton casting, with a view to getting in touch with additional foundries who can supply these castings.

The Litchfield Mfg. Company, manufacturer of steel farm wagons, spreaders and loaders, Waterloo, Iowa, has started the erection of an addition to its main building, 50 x 80 ft., of concrete and steel, for which it has purchased machinery for cold rolling shafting. This department was added to take care of its own requirements, but its capacity will be several hundred tons in excess of present needs. The company is also building its own parts, including steel wheels. H. L. Litchfield is president.

The plant of the German-American Portland Cement Company, La Salle, Ill., has been damaged by fire, about \$125,000. The destroyed equipment will be replaced at once.

The Herrick Auto Supply Company, Champaign, Ill., has been incorporated with a capital stock of \$20,000 by Harry Herrick, Ray C. Sparks and others and will equip a machine shop and garage.

The branch plant of the American Fork & Hoe Company at Fort Madison, Iowa, T. T. Hitch, local manager, will erect a factory having a total of 80,000 sq. ft. of floor space. Electric power will be purchased for the operation of the plant and electric drive installed throughout.

The Grinnell Electric & Heating Company, Grinnell, Iowa, will erect and equip a new power station with a capacity of 1200 kw. Coal and ash-handling equipment will be installed.

The North Star Refrigerator & Fixture Company, St. Paul, Minn., William Manteuffel, president, has acquired property at Austin, Minn., where a manufacturing plant will be built.

John Whisler, Gibson, Iowa, is seeking a 1 or 1½-in. automatic screw machine.

The Chicago-Cleveland Car Roofing Company, 535 Railway Exchange, Chicago, is in the market for a good second-hand belt-driven air compressor of recent type and of 300 ft. per min. capacity at 100 lb. pressure. It will also buy a second-hand 12-ft. squaring shear in good condition.

Detroit

DETROIT, MICH., Aug. 21, 1916.

With the past year registering the greatest annual growth in population in Detroit, and the year's construction record over the \$40,000,000 mark, the machinery trade has prospered proportionally. Additions to factories have called for the installation of many machines, and the dealers are finding difficulty in filling orders. In the past week unusually large orders for lathes and grinding machines have been placed, and the demand for drilling machines has increased. Wood-working machinery for construction work is finding a ready market. Deliveries are still from four to six months behind.

The use for a large quantity of steel placed in New York last week by the Ford Motor Company has not been announced definitely. While reports state that it is for the construction of a steel plant, it is more likely intended for the down-river tractor plant which has been contemplated for some time. Some credence is given the report that it is to be used to enlarge the present Ford factory in Highland Park, the officials of the company having stated some time ago that the capacity of the plant would be doubled.

The Armored Motor Car Company, Detroit, has been incorporated at \$100,000 capitalization by Harry W. Frost, 50 West Kirby Street, Detroit; Waldo S. Ross, 623 South Main Street, Sioux Falls, S. D.; Webb C. Artz, 50 West Kirby Street, Detroit, and A. Lester Mancourt, 720 Jefferson Avenue, Detroit. The object of the new company is the manufacture and sale of armored motor cars and devices accessory to them.

Work is well under way on the erection of a new \$30,000 foundry building by the Lakeside Foundry Company, Muskegon, Mich. The structure will be completed Nov. 1 at a cost of \$30,000.

The Piston Ring Company, Muskegon, Mich., has completed

its new four-story factory building and is at present installing machinery. A large number of lathes adapted to the work of making piston rings are being set up. A complete machine shop will occupy the greater part of the new building. A production of more than 100,000 rings a day will be possible with the new factory.

The John Knappe Machine Company, Grand Rapids, Mich., has purchased land upon which will be built immediately an addition. Contracts will be awarded within two weeks.

Delivery of wire wheels from the new factory of the Hayes Wheel Company, Jackson, Mich., will start in September, the new plant having just been brought to completion.

The Motor Horse Company, Detroit, has been incorporated with a capitalization of \$100,000 by Sidney B. Winn, 939 Brush Street, Patrick J. Power and August J. Bloom.

Announcement of plans for the erection of a four-story office building at the plant of the Buick Motor Company at Flint, Mich., has been made by Walter P. Chrysler. The building, which will be a reinforced concrete structure, will cost \$250,000.

A large municipal garage, capable of housing 42 cars, will be constructed by the post office authorities in Detroit. The building will be of concrete construction. William J. Nagel is postmaster.

The Grand Rapids Blow Pipe & Dust Arrester Company, Grand Rapids, Mich., is about to erect a new factory.

The Piston Ring Company, Muskegon Heights, Mich., is completing its new machine shop and foundry and is about to install considerable new equipment.

The Lakeside Foundry Company, Muskegon, Mich., is beginning the erection of a new foundry at a cost of \$30,000.

Milwaukee

MILWAUKEE, WIS., Aug. 21, 1916.

The establishment of new industries directly and indirectly allied with the metal-working industry and the extension of existing shops furnish a continuous demand upon machine-tool builders, who appear to be again approaching a situation like that of six and eight months ago, when orders were taken with indefinite assurances or guarantees of deliveries. The demand, however, is of a different nature, being for domestic purposes and offered in small lots, with single-tool orders predominating. Buyers appear satisfied to get delivery of one or two machines at a time, but put in new bids as old orders are filled, which forms a continuous draft upon the manufacturers.

At this time there is much activity in electric public utility circles, and the general movement of small units into syndicate hands greatly strengthens the likelihood of much-needed improvements and extensions being undertaken at once instead of awaiting the garnering of sufficient capital. Evidence is already at hand of the revival of purchasing of heavy generating equipment and appurtenances.

A somewhat disturbing factor in the aluminum goods industry is the serious shortage of raw and semi-finished materials, which has already forced a small interest to close shop temporarily to await new stocks. The construction of new garages and shop additions to existing buildings continues at a rapid rate and in large volume. A feature of the demand from these sources is the heavy and more expensive equipment desired, compared with the requirements for these purposes in past years. In the smaller cities, at least, the garages have taken the place of the commercial machine shops, or the shops are made to form the nucleus of garage businesses, so that more elaborate and extensive equipment is required for the dual purposes.

Alfred C. Clas, architect, Colby-Abbot Building, Milwaukee, is closing bids this week for the erection of a new shop unit for the Falls Motors Corporation, Sheboygan Falls, Wis. It will consist of a motor assembly shop, 120 ft. square, with a motor repair shop wing, 72 x 85 ft.

The Nash Motors Company of Maryland, organized by C. W. Nash and an Eastern syndicate to take over the Thomas B. Jeffery Company, maker of automobiles and commercial cars, Kenosha, Wis., has been granted a license to do business in Wisconsin. The statement says the capital stock is \$5,000,000 and the Wisconsin interest is \$2,500,000.

The Worden-Allen Company, Milwaukee and Chicago, has been awarded the contract for erecting the new 25,000-kw. auxiliary power plant for the Wisconsin Power, Light & Heat Company at Portage, Wis. It will be of steel and brick, 100 x 180 ft., one-story and basement. The order for turbines has been placed with the Allis-Chalmers Mfg. Company. The engineers are Woodmansee & Davidson, Chicago and Milwaukee.

The Brand Stove & Range Company, 303 Sixth Street,

Milwaukee, filed articles of incorporation on Aug. 15. The authorized capital is \$25,000 and the incorporators are William F., William A. and Clarence F. Hyde. The company is not ready to announce its plans.

The Green Bay Avenue Garage, 1459 Green Bay Avenue, Milwaukee, owned by Otto Ladwig, is preparing to build a machine shop addition, 30 x 30 ft., two stories and basement. John Roth, Jr., is architect.

The Federal Engineering Company, Stephenson Building, Milwaukee, is taking bids on steel trusses, sash, a gas producer outfit and hand power crane for the garage and repair shop of Richard Mokros at Mineral Spring Road and Downer Avenue, East Milwaukee, Wis.

The Central Wisconsin Public Service Company, 538 Wells Building, Milwaukee, is taking figures on two 75-kw. units for its plant at Marshall, Wis.; one 75-kw. unit at Reeseville, Wis., and waterwheels, switchboards and transformers at both plants. Estimates on 100-hp. oil engines are also being asked. Philipp Grossman is vice-president in charge.

The Chesbrough-Moss Company, Ltd., Beloit, Wis., wholesale grocer, is having plans prepared for a grocery warehouse and cold storage plant, 60 x 120 ft., two stories and basement.

The Claus Automatic Gas Cock Company, 2601 Vliet Street, Milwaukee, has awarded general contract for its new plant at Franklin and Booth streets to the Raulf Company, 53 Patton Building, Milwaukee. A building permit was granted Aug. 17. The building, planned by Robert A. Messmer & Bro., architects, is 81 x 149 ft., of reinforced concrete and brick.

The Stoughton Wagon Company, Stoughton, Wis., maker of farm machinery and vehicles, has increased its capital stock from \$250,000 to \$500,000. William C. Hegelmeyer is secretary.

The Thomas S. Watson Company, Majestic Building, Milwaukee, consulting engineer, is preparing plans for enlargement of and new equipment for the municipal waterworks system at Plymouth, Wis. A 1,500,000-gal. per day pumping engine, air compressor, etc., will be required.

F. G. Martin, proprietor of the Mosinee Garage, Mosinee, Wis., has purchased a site, 40 x 120 ft., and will erect a new fireproof garage and machine shop to cover the lot. A full equipment of shop tools will be purchased.

The Kissel Motor Car Company, Hartford, Wis., is making out an extensive building program for the coming winter and the first units, to be undertaken at once, will be an addition, 77 x 123 ft., to the sheet-metal shop, and an addition, 40 x 100 ft., to the new three-story body and finishing shop erected last spring. Details of other additions have not been completed.

Escanaba, Mich., has engaged A. Arntzen, architect, to prepare plans for an addition to high school, to be used for a manual training department.

The Sharp & Denicke Garage Company, Mauston, Wis., will build an addition to its garage, 40 x 100 ft., for repair shop purposes.

The Overland-Green Bay Company, Green Bay, Wis., awarded general contract for its garage and service station, 100 x 120 ft., two stories and basement, to the Hagemaster Company. W. L. Calahan is general manager.

The Wisconsin Motor Mfg. Company, Milwaukee, is now on a regular production of Diesel oil engines for marine purposes. The standard model is rated at 60 hp. and is a two-cylinder, two-cycle design, worked out by A. F. Milbrath, chief engineer.

R. J. Clark, Coloma, Wis., is erecting a garage and repair shop, 40 x 80 ft., one-story and basement.

The Jersild Fire Escape Company, Neenah, Wis., has determined to establish its works and headquarters at Waupaca, Wis., and will lease quarters until it can erect and equip its own plant. Offices will also be maintained in Neenah. The corporation perfected its organization by the election of the following officers: President, J. N. Jersild, Neenah; vice-president, Gustave Kalfabs, Neenah; factory secretary, Ingolf Uvron, Waupaca; home secretary, G. G. Barlow; treasurer, John Madsen, Waupaca. The production will require a considerable tonnage of light structural material and wire cable.

Sheboygan, Wis., is taking bids for the erection and complete equipment of a municipal garage.

B. H. Kleinert, Morrisonville, Wis., will open a machine and automobile repair shop at Keyeser, Wis.

The Gehl Brothers Mfg. Company, West Bend, Wis., has placed its foundry on overtime schedules and is employing a night shift because of the demands from its gasoline engine and farm machinery production departments. The com-

pany, like other founders, is complaining over the serious shortage of skilled foundry labor, which restricts production to a great extent.

S. A. McLean, Richland Center, Wis., will erect a two-story brick and concrete building, the first floor and basement to be used as a garage and machine shop.

The West Bend Aluminum Company, West Bend, Wis., kitchen utensils, drawn work, etc., has been obliged to close its plant for at least three weeks because of the lack of raw material. The company has large orders on its books which would keep a normal capacity fully occupied for nearly 18 months.

The Sheboygan Railway & Electric Company, Sheboygan, Wis., has been purchased by the American Public Utilities Company, Grand Rapids, Mich., and the name has been changed to Sheboygan Electric Company. It is understood that important improvements projected by the former owners will be carried out as planned. The purchase price is said to be \$2,110,000.

The Chicago, Milwaukee & St. Paul Railway Company has been granted a permit to build a private machine shop at its elevator E in Milwaukee, the capacity of which is being increased from 1,000,000 to 1,600,000 bu. The lessee is the Taylor-Bourne Company, Milwaukee.

The DePere Electric Light & Power Company, DePere, Wis., which started work recently on changing its system from direct to alternating current, is meeting with great difficulty in getting prompt delivery of machinery and equipment and probably will not be able to complete the project before Jan. 1.

The Sanitary Refrigerator Company, Fond du Lac, Wis., owned by the same interest operating the Fond du Lac Church Furniture Company, and using part of the latter's works, will immediately build a plant of its own, 80 x 100 ft., three stories and basement, to be ready Nov. 1. The refrigerator interest has been incorporated as a separate company, with a capital stock of \$200,000. William Mauthe, H. R. Potter and D. D. Sutherland are the promoters.

Cincinnati

CINCINNATI, OHIO, Aug. 21, 1916.

Press reports of the activity in railroad shops in this vicinity are correct; urgent efforts are being made to repair rolling stock. The activity, however, has not brought out any large lists of machine tools from any of the different railroads; buying is still confined to single tools. Purchasing on the part of automobile and auto-truck manufacturers is still keeping up, but most of this business is transacted quietly. Lathes are in better demand than any other kinds of machines and one maker, it is stated, is sold up to Jan. 1.

The shortage of finished material was only temporarily relieved, and jobbers' stocks of twist drills and high-speed cutting tools have been drawn on to such an extent that it is difficult to make deliveries on orders now received. As a rule, the manufacturers have been compelled to cut down specifications on many articles in an effort to evenly distribute shipments to their many customers. The rapid advance in costs in the past 18 months has made it difficult for some manufacturers to correctly gage manufacturing expenses and to fix selling prices accordingly. This probably applies more directly to makers of portable electric tools and boiler and tank manufacturers. The foundries are busier, although weather conditions still have an effect on the labor supply.

The Central Brass & Fixture Company, Springfield, Ohio, manufacturer of automobile accessories, has purchased a manufacturing building, 50 x 350 ft., from the Winters-Coleman Scale Company, and will shortly add considerable equipment.

The Ohio Storage Battery Company, Columbus, Ohio, recently incorporated with \$20,000 capital stock, will be located at 79 East Spring Street. It will not manufacture batteries, as was rumored, but will act as distributors for the National Carbon Company.

The John W. Brown Company, manufacturer of automobile accessories, Columbus, Ohio, is installing several electric ovens in its plant on Marion Road.

The Lancaster Lens Company, Lancaster, Ohio, is making an addition to its plant estimated to cost \$35,000.

The new plant of the American Tool Works Company, Cincinnati, is now well under way, and is expected to be in operation by Nov. 1.

The Pfau Mfg. Company, Norwood, Cincinnati, will soon commence construction of its new addition to be 60 x 350 ft., three stories, of concrete and steel. A power plant will also be added. Most of the building will be devoted to the manufacture of plumbing pottery ware, and it is reported that very little of the equipment has yet been purchased.

The Cincinnati Coffin Company, Cincinnati, has let contract for an addition to its plant in West End. Some special wood-working equipment will be installed.

The Vail-Rentschler Tractor Company, Hamilton, Ohio, will soon be incorporated by Gordon S. Rentschler, J. A. Vail, and others, and will establish a plant for the manufacture of lightweight farm tractors. Equipment details are not yet available.

The Domestic Engineering Company, Dayton, Ohio, has completed the foundations for its new plant at Moraine City, a suburb. A part of the equipment has been purchased.

It is reported that the Lindley Box & Paper Company, Dayton, Ohio, intends to remove its plant to Marion, Ind.

The Metals Machining Company, Dayton, Ohio, has been incorporated with \$10,000 capital stock by Charles F. Dye and others.

The Bickett Machine & Mfg. Company, Cincinnati, recently closed contract with the Montague Mailing Machine Company, Chattanooga, Tenn., to manufacture its automatic mailing machines. The Bickett Company is adding equipment to its plant, most of which has been purchased; but it is in the market for a nickel-plating outfit.

The United States Motor Truck Company, Cincinnati, at its recent annual meeting, voted to increase the capital stock from \$300,000 to \$1,000,000, divided into preferred and common. The preferred is cumulative 7 per cent, but participates in earnings with the common up to 10 per cent. The directors declared the regular annual dividend of 7 per cent on the preferred, and placed quite a large sum to the credit of surplus from the excess earnings of the company. R. C. Stewart, president of the company since 1914, has ably directed and developed the business to its present prosperous condition.

The Central South

LOUISVILLE, KY., Aug. 21, 1916.

Business holds up well with prices stiff and tending upward in the increase in prices of steel. Contractors' oil well, quarry and rock-crushing machinery, mine equipment and sawmill and wood-working machinery are all in demand, while electric motors, machine tools, etc., are active. Labor shortage is being felt in this territory and there is not a manufacturer who could not use more skilled workers.

The United States Motor Truck Company, Covington, Ky., a suburb of Cincinnati, has increased its capital stock from \$300,000 to \$1,000,000. Additional machinery will be installed sufficient to more than double the present output of motor trucks.

The Louisville Veneer Mills, Louisville, Ky., will install mechanical veneer drivers and lumber dry kilns. D. E. Kline is manager.

Purchase of the B. F. Meed & Sons Company, manufacturer of fishing reels, by the Horton Mfg. Company, Bristol, Tenn., has been announced. The Louisville factory, 1450 South Eighteenth Street, will be continued for the present.

The Columbia Motor Car Company, authorized to manufacture and sell motor trucks, has been incorporated with \$10,000 capital by F. R. Hodapp, E. E. Miller and J. L. Saylor.

Instead of selling its plant, the Flemingsburg Light & Ice Company, Flemingsburg, Ky., will call for an additional \$8,000 of stock, which has been authorized, and will install new alternating current machinery.

To manufacture a device designed to save gasoline in internal combustion engines, the Glover Fuel Economizer Company has been incorporated in Louisville with \$10,000 capital by Oscar C. Glover, Hugh VanArsdale and Robert W. Polley.

The McFerran Smoke Abater Company has been incorporated with \$30,000 capitalization to manufacture smoke prevention devices by B. W. Cornelison and J. J. Roberts.

E. L. Binns, superintendent of the Southern Foundry Company, Owensboro, Ky., has announced acceptance by his company of a contract to manufacture fittings for marine engines for the Duplex Engine Governor Company, 36 Flatbush Avenue Extension, Brooklyn, N. Y. The first order on the contract called for 6000 pieces.

The Ferguson Hardwood Company will take over and re-equip the former Ferguson-Palmer Lumber Mill on South Third Street, Paducah, Ky., and plans to begin operations Jan. 1, specializing in steamboat, furniture and railroad timbers, in lengths up to 60 ft. John K. Ferguson is president.

Operations are to be resumed at the Lenanna Shipyards, ten miles below Maysville, Ky., on the Ohio River, with work enough booked to keep the plant going for the balance of the year.

The Elkhorn Coal Company, Mater, Ky., will build an incline and tippie, the latter to be equipped with a retarding conveyor of the rope-and-button pattern.

It is reported in Jeffersonville, Ind., that the United States Government will build a plant at that point for the manufacture of military supplies. Major T. B. Hacker is Quartermaster of the United States Army Depot at Jeffersonville.

The Southern States Warehouse Company, Chattanooga, Tenn., by C. S. Kinney, general manager of the Gulf Compress Company, Memphis, Tenn., will build a compress of 250,000 bales, a season capacity, and a warehouse of 12,000 bales capacity.

The King Fuel & Economy Company, with \$25,000 capital, incorporated at Chattanooga by J. B. King, E. H. Hunter, O. W. Reeves, and others, has contracted with the Eagle Mfg. Company, Cincinnati, for the manufacture of a fuel saving device, and later will equip a plant of its own.

J. E. Waldron, E. E. Bean, Sr., and John R. Evans are among the incorporators of the Chattanooga Handle Company, Chattanooga, Tenn., which has \$10,000 authorized capital.

William Whiting, Elizabethton, Tenn., is in the market for a 250 to 400-kw., 440-volt, three-phase, 60-cycle non-condensing steam turbine and four 150-hp. induction motors for the same current.

Baltimore

BALTIMORE, Md., Aug. 21, 1916.

A pattern shop of reinforced concrete will be built at the plant of the Maryland Steel Company, Sparrows Point, Md.

Extensive refrigerating and heating systems will be installed at Richmond Market by the City of Baltimore.

The Central Hard Fibre Company, West Somerville, Mass., is understood to be planning to locate in Wilmington, Del.

Two blocks adjoining the plant of the Midvale Steel Company, Wilmington, Del., which was formerly the plant of the Diamond State Steel Company, have been purchased by the Midvale Company and it is stated that the capacity of the plant will be greatly increased by the construction of additional mills. Arrangements are in the hands of the Philadelphia office of the company.

Engineers have begun the survey of the Battery Park tract of land at New Castle, Del., which will be the location of the newly-formed Delaware Shipbuilding & Engineering Corporation. It is understood that T. Coleman DuPont, Wilmington, is interested in the new organization. J. S. Bowden has charge of the company's affairs at New Castle.

The Brunswick Motor Company, Lawrenceville, Va., has been incorporated with \$10,000 capital stock. E. W. Ligon is secretary.

With \$25,000 capital stock the Seaboard Broom Company, Petersburg, Va., has been incorporated. Bartlett Roper, Petersburg, is secretary.

The Appomattox Iron Works & Supply Company, Petersburg, Va., has been incorporated with \$100,000 capital stock. L. B. Shakelford is secretary.

The Garrison-Walbrook Garage, Inc., Baltimore, has been incorporated by Herbert B. Stimpson, 400 Equitable Building; George M. Zingsheim and George D. F. Robinson. It is capitalized at \$40,000.

An accident to a large electric crane at the plant of the Baltimore Tube Company, Wicomico and Ostend streets, Baltimore, damaged it to the extent of about \$3,000.

St. Louis

ST. LOUIS, Mo., Aug. 21, 1916.

Machine-tool inquiry continues good in all lines. No lists of any considerable size have appeared. Dealers report, however, a marked stiffening in deliveries, being now unable to contract for as favorable datings as in the recent past. The exact cause for this is not known, aside from the fact that demand reported in other centers is responsible. Business continues mostly for single tools. The aggregate is satisfactory and the outlook is good. Collections are reported very excellent, with business conditions all through the St. Louis trade territory satisfactory. Money is easily obtainable both for commercial loans and investment.

The Bilgers-Kavanaugh Automobile Company, St. Louis, Mo., has been incorporated with a capital stock of \$15,000 by George A. Bilgers, Edward P. Wachter and J. Beggs Kavanaugh to manufacture automobile accessories, and equip a garage and machine shop.

The St. Louis Independent Packing Company, St. Louis,

Mo., has begun the erection of a five-story cooling plant to cost about \$100,000.

The Winter Garden & Ice Company, St. Louis, Mo., has been incorporated with a capital stock of \$125,000 by Harry C. Wood, Cincinnati; L. A. Belle and G. B. Engelmann, both of St. Louis, and will equip a large building already acquired for an ice-skating rink, installing an ice plant costing about \$100,000, capable of freezing 125 tons daily. A storage plant will also be equipped. Thomas P. Barnett is architect.

The Luxora Cooperage Company, St. Louis, Mo., has been incorporated with a capital stock of \$40,000 by Charles Wunderlich, George W. McBride and Paul T. Bolz, St. Louis, and George E. Carter, Luxora, Ark., to manufacture cooperage.

The Auto Devices Company, St. Louis, Mo., has been incorporated with a capital stock of \$27,500 by Charles W. Price, R. L. McDonald and Louis F. and Fred Abel to manufacture automobile accessories.

The Monsanto Chemical Company, St. Louis, Mo., will erect and equip two additions to its plant, one 60 x 156 ft., three stories, and one 60 x 142 ft., two stories.

The Mineral Refining & Chemical Corporation, Railway Exchange Building, St. Louis, Mo., and 80 Wall Street, New York, will equip a plant at St. Louis with a first unit capable of producing 50 tons daily of a zinc product to substitute for white lead and zinc oxide in paint. Jose Marimon, president, is president of the Spanish Bank of Cuba, Havana.

The St. Louis & San Francisco Railroad, V. K. Hendricks, St. Louis, chief engineer, will build and equip a roundhouse and machine shop at St. Louis to cost about \$25,000.

The Kansas City Oakland Auto Company, Kansas City, Mo., has been incorporated with a capital stock of \$15,000 by E. W. and Otto M. Arrasmith and W. E. Myers to equip a garage and machine shop.

The G. L. Mining Machinery Company, Kansas City, Mo., has been incorporated with a capital stock of \$15,000 by Charles H. Goetsche, W. J. Coonrod and H. G. Schuler.

The Automatic Turntable Company, Kansas City, Mo., has been incorporated with a capital stock of \$50,000 by J. Tinsley, William P. Kerl and T. E. Wallin to manufacture turntables for railroads.

The Browning-Purdin Electric Company, Brookfield, Mo., has been incorporated with a capital stock of \$14,000 by P. W. Harry, Lou W. Markham, and others, to equip an electric light and power plant.

The city of St. Joseph, Mo., will issue \$85,000 of bonds for the reconstruction and re-equipment of its electric light plant. Stevens & Stille, Kansas City, Mo., are the engineers.

The American Explosive Company, George W. Qualls, Carthage, Mo., and A. B. McAbee, Pittsburgh, Pa., interested, will install about \$100,000 of equipment for the manufacture of dynamite, near Sarcosie, Mo. The capacity of the plant is to be 30,000 lb. per day.

The Grossenbacher Mfg. Company, Overland, Mo., is reported in the market for equipment for making sheet-metal stampings, spinnings, etc.

The Planters Gln Company, Garland, Ark., has been incorporated with a capital stock of \$18,000 by Allen Winham, E. J. Wilson, J. D. Williams and J. W. Cronk, and will install cotton-ginning equipment, with power plant.

The Farmers' Gln Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$50,000 by R. T. Harrias, Glen C. Hart and J. H. Wamsley, and will equip a plant at once.

The Mid-West Glass Casket Company, Wichita, Kan., will equip a plant at Fort Smith, Ark., at a cost of \$200,000 to manufacture glass caskets, bath tubs, etc.

The Allen Portable Hoister Company, Madille, Okla., has been incorporated with a capital stock of \$15,000 by R. M. Harris of Madille, W. P. Allen and C. H. Brown of Russet, Okla.

The Planters' Gln Company, Ebenezer, Miss., will install three 70-saw gin outfits at once. S. E. Sample is president and B. W. Humphrey secretary.

The Anderson-Tully Company, Vicksburg, Miss., will equip a sawmill at Hattiesburg, Miss., the equipment being estimated to cost \$25,000.

R. F. Learned & Son, Natchez, Miss., will build and equip a sawmill and are in the market now for the machinery.

Brookhaven, Miss., will drill a deep well and install 500 gal. per min. pumping machinery.

Winter & Ford, Starkville, Miss., will equip a mill for the manufacture of handles.

The Pan-American Shipbuilding & Salvage Company, 925

Whitney Building, New Orleans, La., has been organized with \$1,000,000 capital and will install wood-working machinery and shipyard equipment. T. W. Kracke should be addressed.

The City Commission, Shreveport, La., will receive bids until Sept. 5 for equipment for a waterworks pumping station filtration plant, engines, boilers, etc. John B. Hawley is consulting engineer.

The Crescent Bed Company, Broad and Gravier streets, New Orleans, La., is in the market for two shaping machines, one 16-in. stroke and one 18-in. or 20-in. stroke.

Texas

AUSTIN, TEX., Aug. 19, 1916.

The new law requiring all cities and towns located upon running streams to install sewage disposal plants within a given period is causing a big demand for machinery of this character by the different municipalities of Texas. Crop conditions continue most favorable and the machinery and tool trade is satisfactory.

The Bencini Cotton Oil Company, Dublin, will install machinery to crush peanuts in its cotton-seed oil mill. The improvements will cost about \$18,000.

The West Texas Sulphur Company plans to install machinery for mining and refining sulphur at its sulphur mines near Toyah.

The Beeville Ice, Light & Power Company which has been incorporated with a capital stock of \$30,000, will build an electric light and power plant and ice factory at Beeville. H. Hamilton is a stockholder.

San Francisco

SAN FRANCISCO, CAL., Aug. 15, 1916.

While local shops are well occupied and some are expanding, business within the city is curtailed by the uncertain labor outlook. In other quarters, also, machine-tool orders come through slowly owing to unsatisfactory prices and deliveries, although inquiries are abundant. On the east side of the bay, from San Leandro to Richmond, and at some interior points, foundries and shops are generally running at utmost capacity, putting on extra shifts rather than add to their equipment. Similar conditions are reported around Los Angeles, where the machine-tool business is relatively better than here. The largest buyers have been shipbuilders, who are still figuring on additions. Railroad buying has been fairly good, but is slowing down now. Some substantial orders have been placed by traction engine manufacturers. Engine builders are making many improvements, but their purchases of new tools have been limited.

Local gas engine consolidations are receiving considerable attention. The Standard Gas Engine Company, which last week bought out the Corliss plant at Petaluma, is building a 135-ft. addition to its Oakland works to accommodate the equipment, which will give a much larger output than both plants running separately. This week a deal has been closed for the consolidation of the Imperial Gas Engine Company and the Atlas Gas Engine Company, in a corporation capitalized at \$1,000,000. Axel Warenskjold, former president of the Atlas Company, is president; E. R. Moffitt, of the Imperial Company, vice-president; L. A. Moberry, secretary; M. E. Wright, treasurer; and John Lorimer, superintendent. An addition, 80 x 250 ft., will be built at the Atlas plant in Oakland, to accommodate the equipment of the Imperial shop now in this city, which was materially increased last year. No new equipment is contemplated. Diesel engines will be added to the output.

The Hall-Scott Motor Company, West Berkeley, Cal., manufacturer of aeroplane engines, is making further additions to take care of numerous foreign orders.

The American Corrugated Culvert Company has secured permission to issue 210 shares to C. K. Doak and T. Weyburn in exchange for the plant of the Standard Corrugated Pipe Company, San Francisco, with agency contracts in northern California; also to sell 150 shares at par, \$100 net.

The Standard Oil Company has secured a site at Los Angeles Harbor for a ship repair plant, to take care of its tank steamers calling at that port.

The Samson Sieve-Grip Tractor Company, Stockton, Cal., has been granted permission to issue 250,000 shares of common stock to the Samson Iron Works for its plant and assets, and to sell 150,000 shares at par, \$1, to net the company 90 cents. The announced intention is to install \$50,000 worth of new machinery. The property, not including patents, is valued at \$454,000, and liabilities amounting to \$215,000 will be assumed.

Plans are being drawn for a three-story office building for the Union Iron Works, Twentieth and Illinois streets, San Francisco. This company has arranged for a large addition to its Alameda waterfront holdings, and announces that its plant there will be made one of the best equipped shipbuilding plants in the country.

The Monarch Foundry Company, Stockton, Cal., has installed a 3000-lb. Heroult type electric steel furnace.

The Santa Maria Gas & Power Company has leased a site for a machine shop at San Luis Obispo, Cal.

The Board of Trade of Bakersfield, Cal., announces that a new beet sugar factory is to be built at that place early next year.

The California Delta Farms Company has taken a contract for building a drainage system on 26,000 acres in Reclamation District 999, below Sacramento. The contract will include the installation of a number of large pumps.

The Public Service Commissioners, Los Angeles, have been taking figures on a lot of machine tools.

The Union Tool Company, Los Angeles, has received permission to sell 2500 shares of preferred stock at par, \$100, to net the company \$90.

The Pacific Northwest

SEATTLE, WASH., Aug. 15, 1916.

Production of lumber in the great fir district of western Washington and Oregon is still below normal; orders and shipments of lumbers are also below the usual standard. Actual production for the past week amounted to 68,423,657 ft., from 121 mills, or 10.30 per cent below normal. Harvesting in eastern Washington is at its height and estimates place the wheat crop at high figures. Machinery men have been very busy the past month supplying harvesting machinery. The fruitgrowers throughout Oregon and Washington are very optimistic.

Despite strike conditions in the Puget Sound country, Seattle's waterborne commerce in July again exceeded \$1,000,000 per day, totalling \$32,511,410 for the month, a gain of \$10,979,168 over July of last year. This gain was due directly to foreign trade, the domestic trade only holding its own. The greatest gain in foreign imports was piled up by the Oriental trade. The export trade to Vladivostok made the sensational record of \$3,186,617, as compared with nothing for July, 1915. Despite the longshoremen's strike, a total of 3,233 cargoes arriving or departing in offshore, local, Puget Sound and Alaska vessels have been worked at the Seattle port between July 1 and July 22.

It is announced that the shipbuilding plant to be erected by Swift interests of Chicago will be built in Portland, Ore., instead of Flavel, as at first indicated.

The American Soda Products Company, Lakeview, Ore., has made its first shipment of soda ash from Alkali Lake. The company is installing machinery that will increase its output from 14 to 60 tons a day.

The Bloedel Donovan Lumber Mills, Bellingham, Wash., has recently secured an order from the British Government for cutting 78,000 railway ties. The order will contain about 2,000,000 ft. of timber, and will require the cutting of between 5,000,000 and 6,000,000 ft. of logs. The ties, which will be used in British railway construction, are 5 x 10 in. by 9 ft. long. The order is the largest tie order ever placed in this country. The British Government is sending two ships to transport the order.

The Port of Astoria, Ore., is in the market for a traveling locomotive crane.

The pumping plant of the Rogue River Public Service Commission at Grants Pass, Ore., was wrecked in a recent dynamite explosion. The 6-ft. drive pulley and 41-in. belt operating the large centrifugal pump were also destroyed.

A. W. Hayland and August Lovgren, Stanwood, Wash., proposes to erect a shingle mill, with four upright machines, etc.

Marsh-Hutton Powers Company, New Westminster, B. C., plans the construction of a five-machine shingle mill at a cost of \$30,000.

Work on enlarging the Asotin Roller Mills, Asotin, Wash., has been started. The entire equipment and machinery now in use is to be replaced. The improvements will increase the output from 50 bbl. to 125 bbl. a day.

The China American Motorship Company, Astoria, Ore., recently incorporated, has announced its intentions of constructing a fleet of five-masted wooden vessels of 4000 tons capacity each, equipped with Diesel engines. The vessels will cost \$315,000 each, and will operate on the Columbia River and Puget Sound.

The Safety First Brake Shoe Company, Seattle, has been incorporated for \$25,000 by W. H. Cook and L. H. Markham.

The Harden Pump Fountain Company, St. Johns, Ore., has begun work on its plant, which will manufacture fountains and playground apparatus. The structure will be 36 x 72 ft., two stories, and is to be ready for operation about Sept. 15.

The Motor Parts Mfg. Company, Portland, Ore., has been incorporated with a capital of \$20,000 by W. H. Chambers, J. C. Gillen and G. N. Smith. A plant is to be erected at Portland.

Contract for the sugar plant to be built in Missoula, Mont., by the Great Western Sugar Company has been awarded to the E. H. Dyer Mfg. Company, of Cleveland, Ohio. The company has also awarded contract for a complete pulp-drying plant to be built in Billings, to the Larowe Construction Company of Detroit. The sugar plant at Missoula will have a daily capacity of 1200 tons and will cost approximately \$1,000,000.

The Hawley Pulp & Paper Company, Enterprise, Ore., has postponed construction of the second additional unit to its paper mills which have been announced. It is probable work will begin about Jan. 1. The completed plant will cost \$1,000,000 and will have daily capacity of 50 tons of paper.

The Sutherlin Brick & Tile Company, Sutherlin, Ore., idle for more than a year, has resumed operations to its full capacity. It is equipped to manufacture 5000 6-in. tile and 12,000 4-in. tile per day.

Canada

TORONTO, Aug. 19, 1916.

In spite of the stimulus to the steel industry in Canada by the demand for munitions, exports of iron and steel and the manufactures of those metals from the Dominion have been far below imports for the past year. The returns for the fiscal year ending March 31, 1916, show that exports of iron and steel and their products totalled \$54,663,597, as against \$14,555,262 in 1915. On the other hand, the amount of imports, principally from the United States, has grown from \$64,758,853 in 1915 to \$76,323,832 at the end of the fiscal year 1916.

An increase of nearly \$500,000,000 in the total trade of Canada in the 12 months ended with May last is indicated by preliminary figures which have been issued by the Trade and Commerce Department, at Ottawa. The amount was \$1,563,230,513. The exports reached a value of \$820,000,000, against \$432,000,000 in 1915 and \$358,000,000 in 1913. The greatest increase was in the export of manufactured goods, which rose from \$45,000,000 to \$261,000,000. The greatest movement to any country was to Great Britain, mostly of war supplies, the total being \$518,000,000 as compared with \$180,000,000 the previous year. However, that this prosperity is not all war-produced is evident from the fact that the exports to the United States increased from \$167,000,000 to \$337,000,000. There was also an increase to France from \$3,000,000 to \$37,000,000. Imports of dutiable goods decreased, dropping from \$447,000,000 the year before the war to \$321,000,000. The chief decrease was in imports from Great Britain, which fell from \$143,000,000 before the war to \$86,000,000.

The Angus shops of the Canadian Pacific Railway, at Montreal, are exceedingly busy making repairs, manufacturing munitions and turning out special orders.

Shortage of labor is the explanation given by Ontario munitions making plants for failure to keep abreast of contracts. Some 40 replies have been received to the letters sent to the various factories by the Provincial War Resources Committee. The shortage of labor is particularly complained of in plants which have recently received contracts for the manufacture of high-explosive shells. In certain of these plants at least 100 skilled workers could be used. Several of the replies advocate the adoption of some plan by which munitions plants would not be deprived of skilled labor by recruiting campaigns. It is suggested that such workers be enlisted and return to work with full recognition of the fact that they are doing their bit as fully as by going to the front. A minority complaint that the profits of war orders are not large enough to warrant them neglecting their regular business.

An issue of £1,000,000 6 per cent debentures is being arranged in London, England, for the Vickers Canadian Company. This will be the first Canadian offering in London this year. The issue indicates extensive additions to the company's plant at Montreal.

J. C. Wilson & Co., Glenora, Ont., are in the market for an overhead traveling crane, hand power or electric driven, capacity 5 to 10 tons, to span from 40 to 50 ft.

Plans have been prepared by Henschien & McLaren, 431

Dearborn Street, Chicago, Ill., for abattoir buildings to be erected for the William Davies Company, Ltd., 521 Front Street East, Toronto. The buildings will cost about \$200,000.

The E. M. Nesbitt Company, Ltd., 10041 118th Street, Edmonton, Alta., has received the contract for erecting a machine shop and storehouse at Edmonton for the Canadian Northern Railway at a cost of \$51,100.

Work has been commenced on the erection of a plant at Falls View, Ont., for the Canadian Aloxite Company, Ltd.

Snyder & Gillette, Niagara Falls, N. Y., have been awarded contract for a foundry for the Pollard Mfg. Company, Ferguson Street, Niagara Falls, Ont., at a cost of \$40,000.

Negotiations for the purchase of the Standard Ideal Company, manufacturer of bath tubs and porcelain goods, Port Hope, Ont., have been completed, and the plant and assets have passed into the hands of a new company to be known as the Port Hope Sanitary Mfg. Company. The vendor was the Montreal Trust Company, and the price paid for the company's assets is said to be in excess of \$1,000,000. The new company is capitalized at \$1,250,000 and its directors include L. M. Wood, president; R. J. Cuff, vice-president; W. D. Ross of the Nova Scotia Steel Company; W. J. Cuff and M. L. Davies. It is reported that the management of the business will be in the hands of R. J. and W. J. Cuff.

The British-Canadian Refining Company has been granted a license by the Ontario Government for the development of power on the Wahnapiatae River, to be used in connection with the smelting works to be established near Sudbury, Ont. The Hon. G. Howard Ferguson, who made the announcement, stated that between \$4,000,000 and \$5,000,000 will be invested in the property.

The Canadian Hanson & VanWinkle Company, Ltd., 15 Morrow Avenue, Toronto, will build an addition to their foundry to cost \$7,500.

The foundry owned by La Fonderie re Thetford, Ltd., at Thetford Mines, Que., which was destroyed by fire with a loss of \$75,000, will be rebuilt.

The Augustine Rotary Engine Company, Ltd., Buffalo, N. Y., is contemplating the erection of a plant at Bridgeburg, Ont.

The Dominion Hardwood Company, Deseronto, Ont., whose plant was recently destroyed by fire, proposes to erect a new plant.

The French Cable Company of Paris, France, has awarded contract to The Standard Construction Company, Halifax, N. S., for cable buildings to be erected on the North Dartmouth Shore, N. S. The contract calls for the construction of wharf and building involving an expenditure of \$70,000.

The Ford-Smith Automobile Truck Manufacturers is contemplating the erection of a plant at Hamilton, Ont.

The International Molybdenum Company is planning equipping an electrically operated refining plant at Renfrew, Ont., at a cost of \$150,000. J. L. Murray is president.

The Toronto Furniture Company, Ltd., Toronto, has been incorporated with a capital stock of \$500,000 by Joseph M. Bullen, 21 Grenadier Road, James H. Fraser, 592 Sherbourne Street; Percy Shulman and others.

The Lincoln Paper Mills, Merritton, Ont., will build a sulphite plant at a cost of \$200,000.

The Doty Foundry, Goderich, Ont., which has been closed for some time will be re-opened shortly. An arrangement has been reached between W. J. Thorold and the Town Council whereby the former will continue operating the plant.

Government Purchases

WASHINGTON, D. C., Aug. 21, 1916.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until date not set, schedule 17, for one precision bench lathe for Brooklyn; schedule 33, for one vertical tubular boiler for Philadelphia; schedule 39, for miscellaneous aeroplanes and power plants, complete, for Pensacola; schedule 41S22, for lever shears.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, August 15, for supplies for the naval service as follows:

Schedule 9898, Steam Engineering

Class 1, Puget Sound—One engine lathe—Bid 105, \$931; 125, \$585; 158, \$646.20; 196, \$910 and \$790; 239, \$902; 268, \$877.82; 341, \$1,073 and \$527.

Schedule 9924, Yards and Docks

Class 121, Portsmouth—One pipe-cutting-and-threading machine—Bid 109, \$1,200; 158, \$1,200; 195, \$1,147.

Schedule 9935, Steam Engineering

Class 171, Charleston—Four sets steam turbine-driven blowers—Bid 273, \$1,321; 291, \$1,370 and \$4,595, total.

Schedule 9940, Ordnance

Class 211, Washington—One apparatus for manufacturing oxygen and hydrogen—Bid 32, \$8,461; 145, \$12,183.

Names of the bidders and the numbers under which they are designated on the above lists are as follows:

Bid 32, Burdett Mfg. Company; 105, Federal Sales & Service Company; 109, Fairbanks Company; 145, International Oxygen Company; 158, Kemp Machinery Company; 195, Manhattan Supply Company; 196, Manning, Maxwell & Moore; 239, Perine Machinery Company; 268, Sherritt & Stoer Company; 273, E. B. Sturtevant Company; 291, Terry Steam Turbine Company; 341, Universal Trading Company.

The following bids were opened Aug. 10 by the chief of ordnance, Army Department, Washington, for furnishing target projectiles.

Item 1, 100 8-in. gun cast-iron shell; 2, 900 10-in.; 3, 600 12-in. gun shell; 4, 400 14-in.; 5, 100 16-in.; 6, 1700 12-in. mortar shell, 700 lb.; 7, 1800 12-in. mortar shell, 1046 lb.

Raleigh Iron Works, Raleigh, N. C., item 1, \$21.48, boxing 75c. extra; 2, \$32.82, boxing \$1; 3, \$47.43, boxing \$1.50; 6, \$33.53; 7, \$39.76, boxing \$1.50.

Birmingham Foundry & Machine Company, Birmingham, Ala., item 2, \$41 unboxed, \$42.50 boxed; 3, \$55.40 and \$57; 4, \$75.90 and \$78; 5, \$109.75 and \$112; 6, \$39.85 and \$41.50; 7, \$44.90 and \$46.50.

Bethlehem Steel Company, South Bethlehem, Pa., bid is for steel in place of cast-iron shell, item 1, \$46.27; 2, \$69.49; 3, \$98.58; 4, \$157.21; 5, \$214.99; 6, \$71.66; 7, \$88.34.

Tredegar Company, Richmond, Va., item 1, \$24.13, deduct for omission of boxing 60c.; 2, \$30.91, deduct 75c.; 3, \$49.46, deduct \$1.28; 4, \$64.21, deduct \$1.50; 5, \$110.15, deduct \$2; 7, \$34.07, deduct \$1.20; 6, \$33.61, deduct \$1.

Mobile Pulley & Machine Works, Mobile, Ala., item 1, \$20.23; 2, \$29.75; 3, \$42.67; 4, \$65.65; 6, \$28.75; 7, \$28.96.

NEW TRADE PUBLICATIONS

Cooling Systems and Flow Meter.—Spray Engineering Company, 93 Federal Street, Boston. Bulletin No. 201 and two folders. The bulletin relates to a system of cooling water for condensers, water jackets, evaporators or transformers by the use of nozzles to throw the water into the air and cool it before it falls into the cooling pond. A description of the system is given and a number of views of installations are included. The first of the folders relates to the use of the system to supply cold circulating water for ammonia condensers in ice plants and also for the steam condensers. Special emphasis is laid upon the low cost of installation and operation and the space economy, two views of a plant equipped with a cooling tower and with the spray system being presented to emphasize the latter feature. The other folder deals with a flow meter for indicating the flow of liquids in pipes. Illustrations and a brief description of the meter are presented.

Chains and Sprockets.—Link-Belt Company, Chicago. Book No. 275. Contains prices for a complete line of chains, sprocket and traction wheels, gears and malleable iron elevator buckets, and supersedes the lists given in general catalog No. 110. A few illustrations and brief descriptions are presented, but for the most part the book is given over to tables of prices, the reader being referred to the general catalog for dimensions and further information about the different products. At the bottom of each page of the book is a reference to the page in the catalog which is superseded.

Iron Cements.—Smooth-On Mfg. Company, 572 Communipaw Avenue, Jersey City. Instruction book No. 16. Shows a number of examples of the uses of the various Smooth-On iron cements. After a brief description of the different cements and their uses, detailed instructions for their application are given. The illustrations of repairs that have been made by them are supplemented by brief descriptions of the work that has been done. The repairs made include pipe joints, pumps, tanks, water jackets, boilers, cylinders, castings, iron stairs, concrete floors, etc. Mention is made of a line of gaskets that can also be supplied.

Air Compressors, Drill Sharpening Machines and Condensers.—Ingersoll-Rand Company, 11 Broadway, New York City. Three bulletins. The first, No. 3033, describes a duplex steam-driven air compressor designed especially to operate with high-pressure superheated steam as well as under ordinary conditions. The operation of the piston valve furnished is explained in detail and engravings of the various sizes of compressors are included. Bulletin No. 4122, super-

seeding No. 4022, explains and illustrates a machine for sharpening rock drilling bits. The special feature claimed for this machine is that the bits are uniform and are made more cheaply than can be done by hand. A number of engravings of the various types of bits that can be sharpened are included. Bulletin No. 9024 treats of the Beyer barometric condenser, which was illustrated in THE IRON AGE, July 6, 1916. The fundamental principles of steam condensing plants are described in detail and this condenser, which is of the counter-current type, is compared with the low-level jet and surface types. Auxiliary apparatus, such as vacuum and centrifugal water pumps, are also shown.

Motor Controllers.—Allen-Bradley Company, Milwaukee. Bulletin B-16. Gives general description and specifications for a motor controller designed for intermittent duty, which was illustrated in THE IRON AGE, March 2, 1916. An illustration and a dimension diagram and table of the controller are presented.

Bronze Bushings.—Bunting Brass & Bronze Company, 723 Spencer Street, Toledo, Ohio. Folder. Pertains to a line of machined bronze bushings and bearings consisting of 8766 standard sizes. These range from 9/16 in. outside diameter and 1/2 in. in length to 5 1/4 in. outside diameter and 9 in. long. Illustrations of a number of different sizes and styles of bushings are presented.

Carbon Dioxide Indicator.—Bacharach Industrial Instrument Company, Pittsburgh. Circular. Refers to a pocket carbon dioxide indicator which was illustrated in THE IRON AGE, March 2, 1916. The special advantages claimed for the indicator are the rapidity and accuracy with which the amount of carbon dioxide in flue and furnace gases can be determined even by inexperienced men, and the fact that it may be carried in the pocket.

Portable Conveying Apparatus.—Jeffrey Mfg. Company, Columbus, Ohio. Bulletin No. 184. Illustrates a line of portable conveying and stacking machinery for handling barrels, bags, boxes and miscellaneous packages. The equipment illustrated and described is adapted for use wherever large quantities of material have to be handled in packed form, for stacking purposes, for delivering material to shipping platforms, for loading it into freight cars, etc. For the most part, the illustrations in the bulletin are of actual installations and the principal features are briefly given in the caption.

Gas and Oil Burning Industrial Heating Equipment.—Tate, Jones & Co., Pittsburgh. Circular No. 155. Describes and illustrates several different types of burners and equipment for industrial heating using either gas or oil as fuel. The descriptions are somewhat brief and a table of the sizes and capacities that can be supplied is included. Mention is made of the motor and steam driven pumping equipment used to supply the oil to the burners at a uniform pressure and illustrations of them are included.

Scrap Baling Press.—Standard Pressed Steel Company of Ohio, Cleveland. Pamphlet. Calls attention to a press for baling iron and steel sheet scrap. Illustrations of the press are presented and a brief description of its construction and operation is given. Views of the product of the press are included.

Sand Blast Nozzle.—W. F. Stodder, P. O. Box 717, Syracuse, N. Y. Circular. Devoted to a sand blast nozzle of the suction type for cleaning castings and removing rust and paint from iron and steel structures. The special feature of this nozzle is the slow rate of speed at which the sand travels through the hose, thus reducing wear. A brief statement of the way in which the nozzle operates is given, and an engraving showing the construction of the nozzle and the arrangement of the air and sand inlets is included.

A brief description of the practice and application of oxy-acetylene welding and cutting in the metal trades is presented in an instruction book, issued by the Prest-O-Lite Company, Inc., Indianapolis. Simple language is employed, technicalities being avoided as far as possible. An effort has been made to condense the available material and give the welding operator only such facts as are necessary to a clear understanding of the process. After a brief introduction dealing with the origin of the process and a description of the materials used, instructions on the setting up of the welding outfit, the care of the blowpipe, and the work that has to be done preparatory to welding, are given. This is followed by instructions as to the use of the apparatus with various metals and different types of blowpipes. Tables of the results that are obtained when the apparatus is used for cutting are presented and a number of safety precautions are included.

